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Re-contemplating the FDA Regulatory Framework for Genome-Edited Food

By Lynette B. Martins

I. INTRODUCTION

"Don't do anything I would do, and definitely don't do anything I wouldn't do. There's a little gray area in there, and that's where you operate."

Spiderman: Homecoming[1]

Science fiction—be it in print or on screen—is rife with examples of genetic

[1] SPIDER-MAN: HOMECOMING (Columbia Pictures & Marvel Studios 2017).

engineering gone horribly awry. There is the familiar story of a genetically engineered spider that bites a young man, Peter Parker, gifting him with spider-like abilities.[2] Marvel has capitalized on this fanfare with other loveable superheroes, such as the X-Men.[3] In many of these movies, the genetically engineered "mutant" is a savior helping society achieve "good" by eliminating nefarious characters. Indeed, Peter Parker said, "Whatever life holds in store for me, I will never forget these words: 'With great power comes great responsibility.' This is my gift, my curse."[4] While Peter embraced his capabilities, acknowledging that he can do some good, others throw more caution to the wind. In the prologue of *The Little Shop of Horrors*, a three-girl chorus warns us about what imminent threat looms ahead.[5] The horror, as it turns out, is a carnivorous enormous Venus flytrap that thrives on human blood and not the insects it ordinarily consumes.[6]

While this fictional movie provides comedic relief, the premise of a plant gone rogue may not be as far-fetched as one may have once imagined. Two relatively recent tools have begun to chart that path from science fiction to possibility. CRISPR/Cas-9 (Clustered Regularly Interspaced Short Palindromic Repeats)[7] and TALENs (Transcription Activator- Like Effector Nucleases)[8] provide scientists with precise methods of genome editing, revolutionizing science in its wake.

The importance of genome-edited food cannot be understated. According to current

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2 Acknowledging the gravity of his powers, Peter Parker says, "Who am I? I'm Spider-man." SPIDER-MAN (Columbia Pictures 2002).

3 *See* X-MEN (20th Century Fox 2000); ERIC LEWALD & JULIA LEWALD, X-MEN: THE ART AND MAKING OF THE ANIMATED SERIES (2020).

4 SPIDER-MAN: HOMECOMING, *supra* note 1.

5 LITTLE SHOP OF HORRORS (The Geffen Company 1986).

6 *Id.*

7 Mazhar Adli, *The CRISPR Tool Kit for Genome Editing and Beyond*, 9 NATURE COMMC'NS 1, 2 (2018).

8 J. Keith Joung & Jeffry D. Sander, *TALENs: A Widely Applicable Technology for Targeted Genome Editing*, 14 NATURE REVS. MOLECULAR CELL BIOLOGY 49, 49 (2013).

estimates, approximately 735 million people face hunger, perhaps from the confluence of unrelenting conflicts and the ever-widening income inequality gap.[9] Layered onto this is the expansion and subsequent sustenance needs for a global population projected to expand from 8 billion to 9.7 billion by 2050.[10] In the United States (U.S.), approximately sixty percent of adults struggle with a diet-related chronic disease.[11] Genome-edited foods can address these pressing concerns through biofortification, macronutrient engineering, or diversification of crops. Further, genome editing of foods provides a solution to the accelerating pace of climate change and crop production.[12] Recent applications of these tools involve scientists reviving previously extinct species of animals[13] or deleting the genes in tomato plants responsible for a trait that negatively influences flavor.[14] Much like the superheroes mentioned above, these tools can bring a lot of positive change, especially in low-resource environments. Though the prospects are profound and extend globally, there must be governance that constrains the tools to "balance hope and fear."[15] Scholars have questioned whether the current regulatory system can handle novel technologies and advancements in food.[16] This article explores the issues at play.

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9 FOOD & AGRIC. ORG. OF THE U.N., 2023: THE STATE OF FOOD SECURITY AND NUTRITION IN THE WORLD, at xviii–xix (2023).

10 U.N. DEP'T OF ECON. & SOC. AFFS., WORLD POPULATION PROSPECTS 2022: SUMMARY OF RESULTS 3 (2022).

11 Aytug Tuncel et al., *Genome-Edited Foods*, 1 NATURE REVS. BIOENGINEERING 799, 803 (2023).

12 For a more in-depth exploration of the applications for CRISPRcas9, *see id.*

13 Jacob S. Sherkow & Henry T. Greely, *What If Extinction Is Not Forever?*, 340 SCI. 32, 32–33 (2013).

14 Nancy Stamp, *Opinion: Restoring Tomato Flavor*, THE SCIENTIST (Aug. 28, 2013), https://www.the-scientist.com/opinion/opinion-restoring-tomato-flavor-38804.

15 Dana Carroll & R. Alta Charo, *The Societal Opportunities and Challenges In Genome Editing*, 16 GENOME BIOLOGY 2, 9 (2015).

16 Deepti A. Kulkarni, *The Age of Innovation in Food: Is Our Regulatory System Ready?*, 80 MD. L. REV. 41 (2021); *The One That Got Away*, 22 NATURE BIOTECHNOLOGY 1 (2004) (contemplating both the issue and possible solutions, such as creating a department dedicated to this work that would be called the Office of Transgenic Oversight (SOTO)).

II. THE U.S. REGULATORY FRAMEWORK FOR GENOME-EDITED FOOD

The overarching purpose of the U.S. regulatory system is to "protect public health, welfare, safety and our environment promoting economic growth, innovation, competitiveness and job creation."[17] The advent of new and efficient biotechnology has ushered in an era of food innovation, bringing the gaps and inefficiencies in the existing regulatory framework to the fore. In the early 1980s, emerging technology utilized recombinant DNA (rDNA) to optimize more desired plant traits.[18] At the time, the White House Office of Science and Technology Policy (OSTP) took the stance that it would primarily focus on the products being developed and their intended uses rather than the methods employed to do so.[19] It did so ostensibly to balance the evergreen tension between innovation and safety. This largely meant that biotechnology was not to be treated as a separate entity requiring regulation. Rather, three major federal agencies would be tasked with oversight: the U.S. Department of Agriculture (USDA), U.S. Food and Drug Administration (FDA), and the U.S. Environmental Protection Agency (EPA). When matters concerning public health would arise, the Centers for Disease Control and Prevention would get involved.[20]

Recognizing the potential overlap in jurisdiction, the federal government developed a Coordinated Framework for Regulation of Biotechnology to provide more clarity on

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17 Proclamation No. 13563, 76 Fed. Reg. 3,821 (Jan. 21, 2011).
18 Coordinated Framework for Regulation of Biotechnology, 51 Fed. Reg. 23,302, 23,302 (proposed on June 26, 1986), https://www.aphis.usda.gov/brs/fedregister/coordinated_framework.pdf.
19 *Id.*
20 *Id.*

agency roles and responsibilities,[21] which was subsequently updated in 1992 and 2017.[22] The 1992 coordinated framework echoed the 1986 version, stating that regulation "focuses on the characteristics of the biotechnology product and the environment in which it is being introduced, not the process by which the product is created."[23] Furthermore, the framework stated that the regulatory process should not hinge on the introduction of a novel technique.[24] With new food products being developed, manufacturers needed guidance on which agency oversaw the regulation of their products. Evidently, the system functioned well, and has come a long way from the early days of food regulation. Nevertheless, in some instances the system drove up costs,[25] created uncertainty, and unnecessarily burdened developers seeking to navigate the regulatory landscape.[26] This, in turn, stifled innovation and economic growth.[27]

A. GLOFISH AND REGULATORY GAPS

The regulatory path can be problematic because some of these innovative products do not fall neatly into one category or under the purview of one agency. In some cases, products may fall through the regulatory cracks. Take, for example, GloFish,[28] where at

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21 *Id.* at 23,303 ("[F]or the most part, these laws as currently implemented would address regulatory needs adequately. For certain microbial products, however, additional regulatory requirements, available under existing statutory authority, needed to be established. The existing health and safety laws had the advantage that they could provide more immediate regulatory protection and certainty for the industry than possible with the implementation of new legislation. Moreover, there did not appear to be an alternative, unitary, statutory approach since the very broad spectrum of products obtained with genetic engineering cut across many product uses regulated by different agencies.").

22 Exercise of Federal Oversight Within Scope of Statutory Authority: Planned Introductions of Biotechnology Products into the Environment, 57 Fed. Reg. 6,753 (Feb. 27, 1992); Modernizing the Regulatory System for Biotechnology Products, 84 Fed. Reg. 27,899 (June 14, 2019).

23 Exercise of Federal Oversight Within Scope of Statutory Authority, 57 Fed. Reg. at 6,753.

24 *Id.*

25 Memorandum from Executive Office of the President for Heads of Food and Drug Administration, Environmental Protection Agency, and Department of Agriculture, Regarding Modernizing the Regulatory System for Biotechnology Products 2 (July 2, 2015).

26 *Id.*

27 *Id.*

28 GLOFISH, https://www.glofish.com (last visited Mar. 22, 2024).

least three government agencies had potential oversight and all three claimed to lack jurisdiction.[29] The product was a fish that fluoresced red under ultraviolet light.[30] It was intended as an aquarium pet and not for consumption.[31] The FDA stated that it would not regulate this product because it was not intended for consumption—an outcome that conflicted with statements from then-deputy commissioner suggesting that all transgenic fish would be regulated regardless of consumption.[32]

Indeed, it is often through the gaps in the regulatory framework that these examples arise. On December 9, 2003, the FDA released its official statement declining to assert authority over GloFish.[33] Yet, not long after, the Center for Genomic Gastronomy released videos promoting and instructing people on how to make GloFish sushi (although the company that distributes GloFish does not appear to endorse this).[34]

B. OXITEC AND REGULATORY OVERLAP

While regulatory gaps pose one concern, regulatory overlap poses another. This happens when a new product does not fit neatly into any one category within any one agency's purview. For example, Oxitec is a company attempting to genetically modify a mosquito to stem the spread of a contagious disease that the mosquito hosts.[35] The product

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29 Priya Nagare et al., *Genetically Engineered Zebra Fish-Fluorescent Beauties with Practical Applications*, 4 ASIAN J. ANIMAL SCI. 126, 127–28 (2009).

30 *The One That Got Away*, *supra* note 16.

31 *Id.*

32 *Id.*

33 *See* Priya Nagare et al., *supra* note 29, at 127 (including the FDA's GloFish Statement, "Because tropical aquarium fish are not used for food purposes, they pose no threat to the food supply. There is no evidence that these genetically engineered zebra danio fish pose any more threat to the environment than their unmodified counterparts which have long been widely sold in the United States. In the absence of a clear risk to the public health, the FDA finds no reason to regulate these particular fish.").

34 *Glowing Sushi*, THE CTR. FOR GENOMIC GASTRONOMY, https://genomicgastronomy.com/work/2010-2/glowing-sushi/ (last visited Mar. 20, 2024).

35 OXITEC, https://www.oxitec.com (last visited Mar. 22, 2024).

here is the mosquito and, as such, it falls within the purview of the USDA and FDA.[36] Because there is an environmental component involved, it also involves the EPA. The interplay between the agencies turned on the definition of the mosquito as a pesticide.[37] To avoid confusion and ensure compliance, clear guidance was needed for manufacturers navigating this framework.

Acknowledging that there may be jurisdictional regulatory overlap, the USDA, FDA, and EPA put forth the Coordinated Framework for the Regulation of Biotechnology.[38] It stated, "[t]he underlying policy question was whether the regulatory framework that pertained to products developed by traditional genetic manipulation techniques was adequate for products obtained with the new techniques."[39] To facilitate this advancement, the Domestic Policy Council Working Group on Biotechnology was established to provide agency expertise for interagency coordination.[40]

III. ETHICAL CONSIDERATIONS OF GENOME EDITING IN FOOD

While more sinister prospects to use genome editing tools can certainly arise, there are a slew of worthy initiatives seeking to serve a societal good. For example, innovative methods to cultivate crops have provided ways to subvert the imminent threat of hostile environments that the climate crisis poses, especially in areas of food deserts.[41] Furthermore, genome editing has allowed manufacturers to improve the nutritional value

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36 *See* U.S. FOOD & DRUG ADMIN., CLARIFICATION OF FDA AND EPA JURISDICTION OVER MOSQUITO-RELATED PRODUCTS 4–6 (2017).

37 *Id.*

38 Coordinated Framework for Regulation of Biotechnology, 49 Fed. Reg 50,856, 50,856 (Dec. 31, 1984) (codified at 40 C.F.R. pt. 158).

39 Coordinated Framework for Regulation of Biotechnology, 51 Fed. Reg. at 23,302.

40 *Id.*

41 *See* Humberto A. Gajardo et al., *The Potential of CRISPR/Cas Technology to Enhance Crop Performance on Adverse Soil Conditions*, 12 PLANTS 1, 1 (2023).

of a product. For example, the company Calyxt was able to remove harmful nucleic acids from the soybean's genome.[42] This increased nutritional value, making it more versatile.[43] Thus far, it is the only genome-edited plant product that has received FDA approval.[44]

The ease, speed, and benefits of genome editing crops has led to an explosion and proliferation of innovation in this area, perhaps necessitating a reimagining of the regulatory landscape to meet the demand of regulatory oversight while also filling the gaps and creating more definitive guidance in cases of jurisdictional overlap.[45]

IV. STATUTORY AUTHORITY

The FDA's authority to regulate foods to ensure they are "safe, wholesome, sanitary, and properly labeled" and "safe, pure, and potent" stems from the Federal Food, Drug and Cosmetic Act (FDCA)[46] and the Public Health Service Act, respectively.[47] Specifically, the FDA regulates the ability to market a product or its ingredients, relying generally on two main sections of the FDCA to ensure the safety of foods. These provisions include the adulteration of food in section 342(a)(1)[48] and food additives in section 348.[49] The FDCA also provides the FDA with enforcement mechanisms including seizure, injunction, and criminal prosecution for those who violate these statutes.[50] Additionally, the FDA requires that developers of color food additives demonstrate "with reasonable

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42 Ashley P. Taylor, *Gene Editing Meets the Food Supply: The New World of Custom-Designed Crops,* MILKEN INST. REV. (July 29, 2019), https://www.milkenreview.org/articles/gene-editing-meets-the-food-supply.
43 *Id.*
44 *Id.*
45 Deepti A. Kulkarni, *supra* note 16, at 47.
46 21 U.S.C. § 393(b)(2).
47 42 U.S.C. § 262(a)(2)(C).
48 21 U.S.C. § 342(a)(1).
49 *Id.* § 348.
50 *Id.* §§ 331–37.

certainty that no harm will result from the intended use of the color additive."[51] However, there is no specific statutory provision or regulation that addresses food produced by new biotechnology.

A. STATEMENT OF POLICY: FOODS DERIVED FROM NEW PLANT VARIETIES (1992)

In 1992, the FDA issued the Statement of Policy: Foods Derived from New Plant Varieties (Statement of Policy) to address concerns and clarify the FDA's interpretation of the FDCA for foods derived from rDNA techniques.[52] The Statement of Policy accomplished several goals. First, it established that evaluating a food product should be on a case-by-case basis, focusing on characteristics of the new plant variety, not the rDNA techniques.[53] Second, it outlined worthy considerations in evaluating both the safety and nutrition of the food.[54] Third, it clarified its responsibilities regarding labeling of the product.[55] The Statement of Policy acknowledged that "any genetic modification technique has the potential to alter the composition of food in a manner relevant to food safety, although, based on experience, the likelihood of a safety hazard is typically very low."[56] It also detailed some areas in which further investigation may be warranted to ensure safety (e.g., unexpected effects, known toxicants, nutrients, new substances, allergenicity, antibiotic resistance markers, plants developed to make nonfood substances and issues specific to animal feeds).[57]

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51 21 C.F.R. § 70.3(i); *Food Chemical Safety*, U.S. FOOD & DRUG ADMIN. (Mar. 6, 2024), https://www.fda.gov/food/food-ingredients-packaging/food-chemical-safety; s*ee also* 21 U.S.C. § 348.

52 Statement of Policy: Foods Derived from New Plant Varieties Notice, 57 Fed. Reg. 22,992 (May 29, 1992).

53 *See id.* at 22,991–92.

54 *Id.* at 22,988–90.

55 *Id.* at 22,991.

56 *Id.* at 22,986.

57 *Id.* at 22,986–98.

While historic practices of food development have been deemed safe by the FDA and do not require pre-market review, existing regulatory pathways ensure the safety of food derived from new plant varieties, including those that are genetically engineered.[58] Congress recognized the long history of food use and products that do not trigger safety concerns and accordingly provided a two-step definition for food additives.[59] The first step "broadly includes any substance the intended use of which results in its becoming a component food."[60] The second step excludes what are termed, 'generally recognized as safe' (GRAS) practices from the definition of food additive substances.[61] As such, they would not need pre-market review. Congress believed that this was a pragmatic approach because regulation of these substances was deemed unnecessary to ensure safety and would overwhelm the FDA and regulated entities alike.[62] Manufacturers must comply with relevant regulations before bringing a product to market. However, for new foods that may not fit into the existing framework, the FDA recommended that companies seek voluntary consultation.[63]

The Statement of Policy also clarified the FDA's approach to labeling of foods derived from new plant varieties.[64] The concerns addressed pertain to the requirement that food producers "describe the product by its common or usual name or in the absence thereof, an appropriately descriptive term and reveal all facts that are material in light of

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58 *Id.* at 22,984–85.
59 *Id.* at 22,989.
60 *Id.*
61 *Id.*
62 *See* David L. Pelletier, *Science, Law, and Politics in the Food and Drug Administration's Genetically Engineered Foods Policy: FDA's 1992 Policy Statement*, 63 NUTRITION REVS. 171, 171–81 (May 2005) (discussing the interplay between law and politics and emphasizing patterns in deregulatory shifts coinciding with one political party).
63 Statement of Policy: Foods Derived from New Plant Varieties Notice, 57 Fed. Reg. at 29,985.
64 *See id.*

representations made or suggested by labeling or with respect to consequences which may result from use."[65] The premise here is that if a food product has been modified from its natural counterpart or if there is some safety concern, then the consumer has a right to know.[66] Withholding information that is a material fact could result in misleading labeling of food under the FDCA.[67] Because the rDNA technique simply accelerates what would occur in traditional breeding methods, the FDA did not consider it material information under section 403(a) which would require disclosure and proper labeling.[68]

V. REGULATORY CHALLENGES

Part of the challenge of regulation and adapting it to emerging technologies is that the process of rulemaking is complex and time-consuming.[69] Years will pass before proposed laws can effectuate their intended policy. Any biotechnology innovations will have to operate within the current regulatory framework. Notably, the major theme underpinning regulatory discussions and biotechnology centers on how much the process of developing the product matters, especially if the developed product bears the same resemblance to the naturally occurring product.[70] Opponents of genetically engineered products are tasked with articulating where the problem lies—with the process or the product itself?[71]

When the relevant statutes were written decades ago, no one could have

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65 *Id.*
66 *Id.*
67 21 U.S.C. § 343(a).
68 Statement of Policy: Foods Derived from New Plant Varieties Notice, 57 Fed. Reg. at 22,984–91.
69 *See* TODD GARVEY, CONG. RSCH. SERV., R41546, A BRIEF OVERVIEW OF RULEMAKING AND JUDICIAL AUTHORITY (2017).
70 Jennifer Kuzma, *Policy: Reboot the Debate on Genetic Engineering*, 531 NATURE 165, 165 (2016).
71 Opponents of genome-edited food often rely on potential risks rather than evidence-based risks. *See* Pelletier, *supra* note 62 at 171–81.

contemplated the constellation of genetic engineering techniques available today. And while the regulatory framework has enjoyed many successes in safety since its inception, it certainly has met with challenges. Some challenges illustrate the complexity of the framework.

For instance, the disparity between FDA regulation of genetic engineering in sugar beets versus in salmon exemplifies the complexity. Sugar beets account for about half of the sugar in the U.S.[72] When farmers genetically engineered an herbicide-resistant sugar beet, some claimed that this could encourage the development of herbicide-resistant weeds.[73] The FDA does not generally require pre-market review for most foods, but it uses voluntary consultation for genetically engineered foods. The FDA conducted a plant pest risk assessment, and, ultimately, litigation required an Environmental Impact Assessment under the National Environmental Policy Act (NEPA) prior to the sugar beet's approval.[74] By contrast, the AquAdvantage salmon, which is genetically engineered with accelerated growth, resulted in the creation of special regulatory pathway with a complex array of considerations.[75] Additionally, the genetic construct used in the salmon was considered a "new animal drug."[76]

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72 *Sugar and Sweeteners Background*, USDA ECON. RSCH SERV., www.ers.usda.gov/topics/crops/sugar-and-sweeteners/background (last updated Oct. 19, 2021).

73 *See* ANIMAL & PLANT HEALTH INSPECTION SERV., U.S. DEP'T OF AGRIC., GLYPHOSATE TOLERANT H7-1 SUGAR BEET: REQUEST FOR NONREGULATED STATUS FINAL ENVIRONMENTAL IMPACT STATEMENT—MAY 2012 533 (2012), https://www.aphis.usda.gov/brs/aphisdocs/03_32301p_feis_std.pdf.

74 *See id.* at 2–6.

75 *See* Kara M. Van Slyck, *Salmon with a Side of Genetic Modification: The FDA's Approval of AquAdvantage Salmon and Why the Precautionary Principle is Essential for Biotechnology Regulation*, 41 SEATTLE U. L. REV. 311 (2017).

76 New Animal Drugs in Genetically Engineered Animals; opAFP–GHc2 Recombinant Deoxyribonucleic Acid Construct, 80 Fed. Reg. 73,104 (Nov. 24, 2015) (codified at 21 C.F.R. pts. 510, 528).

A. *ALLIANCE FOR BIO-INTEGRITY V. SHALALA* (2000)

The FDA's determination in the statement of policy (1992) that genetically engineered foods would not require additional review and would be considered GRAS and not require labeling was met with litigation. In fact, a coalition of scientists and religious leaders challenged the concept that genetically modified foods should be categorized as generally recognized as safe.[77] In this case, plaintiffs challenged the FDA's policy on six different grounds:

> (1) Statement was not properly subjected to notice-and-comment procedures;
> (2) the FDA did not comply with the NEPA;
> (3) the FDA's presumption that rDNA developed foods are GRAS and therefore do not require food additive petitions under 21 U.S.C. § 321 is arbitrary and capricious;
> (4) the FDA's decision not to require labeling for rDNA-developed foods is arbitrary and capricious;
> (5) the FDA's decision not to regulate or require labeling for rDNA-developed foods violates the Free Exercise Clause; and
> (6) the FDA's decision not to regulate or require labeling for rDNA-developed foods violates the Religious Freedom and Restoration Act."[78]

This paper will analyze claims three and four.

In *Alliance*, the court described the FDA's 1992 publication "Statement of Policy: Foods Derived From New Plant Varieties" as a way of understanding the FDA's interpretation of the FDCA.[79] The statement of policy affirmed the assertion that the FDA evaluates food safety based on the actual product and not the tools that are employed to develop the product.[80] The court found that the way the FDA evaluates what is safe or GRAS is sufficient because the option for pre-market review exists for a food additive in

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77 All. for Bio-Integrity v Shalala, 116 F. Supp. 2d 166, 170 (D.D.C 2000).
78 *Id.*
79 *Id.*
80 *Id.*

instances in which safety is a concern.[81] Additionally, NEPA only applies to "major federal action[s]," and the FDA's statement of policy did not constitute agency action subject to NEPA's procedural requirements.[82] The court deferred to the FDA's interpretation of GRAS.[83] It also stated that to be GRAS, a product must meet two criteria: (1) technical evidence of safety in published scientific studies and (2) this evidence must be widely known and accepted amongst scientists.[84] The FDA met its burden to demonstrate these criteria.[85] Regarding labeling, the court noted that the FDA takes the position that no material change has occurred because the change is merely an accelerated version of what occurs in traditional or natural breeding techniques.[86] With no apparent risks to safety, the FDA failed to require this food to be labeled and discounted the motivation to label based on consumer demand.[87]

VI. ANALYSIS

The benefits of genetic engineering in food are abundant. The void in food innovation, somewhat hamstrung by the slow 'food additive' process, has been filled by the prospects brought forth by genome editing tools. CRISPR-cas9 and TALENs are precise and, rather than injecting genetically modified material, they remove a naturally existing nucleic acid or acids.[88] In many ways, these tools have been a godsend for farmers trying unsuccessfully to eliminate undesirable plant traits through traditional means. In their evaluations, regulatory agencies tend to rely on historical uses of the product. For

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81 *Id.* at 172.
82 *Id.* at 174, 178–79.
83 *Id.* at 178–79.
84 *Id.* at 177.
85 *Id.*
86 *Id.* at 178.
87 *See id.*
88 *See* Aldi, *supra* note 7, at 7; *see also* Joung & Sander, *supra* note 8.

example, if a soybean is on the market already, agencies should assess its safety based on what it is, rather than the new methods used to develop it. After all, consumers will consume the product. These tools allow the breeder to efficiently produce a plant that is more appealing either in its nutritional value, or its sustainability than would have been found in nature. One notable success is FDA approval of the genome-edited soybean developed by Calyxt.[89] Scientists were able to delete the nucleic acids and the corresponding result was the more nutritious presence of 'high oleic acids' naturally occurring in oils such as olive oil.[90]

The examples of the Oxitec mosquito and the AquAdvantage salmon are instances where the FDA has regulated a genetic construct, scientifically assessing its safety through a risk profile. The examples also reveal successful cross agency coordination through the FDA, EPA, and USDA.[91] Not long after these examples occurred, the OSTP requested the National Academies of Sciences, Engineering and Medicine (NASEM) to revisit the effectiveness of the current regulatory framework.[92] The NASEM provided specific recommendations regarding the gap in oversight for these agencies in consumer and occupational safety in addition to environmental safety.[93] In an effort to further assess the sustainability of the regulatory framework, the federal government provided

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89 *Calyxt Reports 1st Quarter Financial Results*, SEC. & EXCH. COMM'N, https://www.sec.gov/Archives/edgar/data/1705843/000115752319001130/a51981253_ex991.htm (last visited Mar. 22, 2024).

90 *Id.*

91 NAT'L ACADEMY OF SCIENCE, ENGINEERING, & MEDICINE, PREPARING FOR FUTURE PRODUCTS OF BIOTECHNOLOGY 15 (2017).

92 John P. Holdren et al., *The White House, Improving Transparency and Ensuring Continued Safety in Biotechnology* (July 2, 2015, 2:57 PM), https://obamawhitehouse.archives.gov/blog/2015/07/02/improving-transparency-and-ensuring-continued-safety-biotechnology.

93 NAT'L ACADEMY OF SCIENCE, ENGINEERING, & MEDICINE, *supra* note 91.

recommendations through the National Strategy for Modernizing the Regulatory System for Biotechnology.[94] The main concerns examined were whether existing statutory laws provided each agency with robust tools to accomplish the established objectives of safety.

The upshot of these recommendations is that there is a need to build capacity. The proliferation of the genome-editing crop industry will require exploration of ways to adapt and accommodate the demand. Suggestions include increased civic participation in risk assessment and private-public partnerships to outsource the self-attestation process, especially if developers are small and lack the resources to ensure compliance. Similarly, a concern that was briefly touched on in the opening paragraphs is how the do-it-yourself biology industry will operate within the current regulatory framework. In general, the FDA relies on the manufacturer to meet regulatory obligations to ensure safety in the necessary areas for compliance. But small or mid-sized developers lack the funding and resources to have an internal regulatory compliance system. Perhaps augmented FDA capacity for consultation and expanded educational initiatives can support smaller developers comply with the regulations. With the proliferation of possibilities that these genome-editing tools provide, the regulatory systems should attempt to keep pace with the emerging technologies.

As Kulkarni lays out, even while uncertainty persists through the transitional period of the current administration, there are reasons to be optimistic about the preparedness of

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[94] National Strategy for Modernizing the Regulatory System for Biotechnology Products, Emerging Technologies Interagency Policy Coordination Committee's Biotechnology Working Group (2016); *see also* U.S. Food & Drug Admin., Modernizing the Regulatory System for Plant and Animal Biotechnology Products (2018).

the regulatory framework.[95] For example, the USDA's APHIS issued a rule changing the way it regulated genetically engineered organisms in plants under the PPA.[96] In another example of agency overlap in jurisdiction between the FDA and USDA, a resolution was achieved, albeit after a "turf battle."[97] It is hopeful that this trajectory will continue to chart a path forward that helps the regulatory system achieve its overarching goals of ensuring safety and public health while also fostering economic growth and innovation.

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95 *See* Deepti A. Kulkarni, *The Age of Innovation in Food: Is Our Regulatory System Ready?*, 80 MD. L. REV. 41 (2021).

96 *Id.* at 45.

97 *Id.*

The Real Toxic Crusaders: Prosecuting Companies for Environmental Crimes Under the U.S. Clean Water Act

By Dr. Melissa Jarrell Ozymy and Dr. Joshua Ozymy

I. INTRODUCTION

On February 2, 2014, a drainage pipe owned by Duke Energy at a coal ash containment pond sent twenty-seven million gallons of waste water containing some thirty-nine thousand tons of toxic coal ash into the Dan River near Eden, North Carolina.[1] The

[1] Press Release, Off. of Pub. Affs., Duke Energy Subsidiaries Plead Guilty and Sentenced to Pay $102 Million for Clean Water Act Crimes (May 14, 2015), https://www.justice.gov/opa/pr/duke-energy-subsidiaries-plead-guilty-and-sentenced-pay-102-million-clean-water-act-crimes. Coal ash ponds are often treated as nonpoint sources of pollution, meaning they lack consistent permitting and oversight that would apply to a point source that discharges into the waters of the United States. *See* Jay Crowder, *Notice to SCOTUS: Coal Ash Should be a Point Source Discharge Under the Clean Water Act*, 19 VT. J. OF ENV'T L. 89, 92–112 (2018).

company engaged in illegal discharges from the facility for years and knew its facilities needed repairs, but Duke Energy was negligent in addressing them, which led to one of the country's largest coal ash spills.[2] Duke Energy and its subsidiaries were charged with, and pleaded guilty to, nine criminal violations of the Clean Water Act (CWA).[3] As a result, the companies agreed to pay a $68 million criminal fine, make a $24 million community service payment to the National Fish and Wildlife Foundation, and pay $10 million to a wetland mitigation bank.[4] The companies also agreed to settle $1.1 billion in claims for cleanup costs.[5]

There are multiple avenues to induce compliance with environmental law, which often include incentivizing compliance or offering a range of administrative and civil remedies for noncompliance.[6] But violations of law involving serious harm or culpable conduct—as in the case of Duke Energy's prosecution for negligent conduct that lead to serious environmental, financial, and human health implications—may incur criminal charges centered on punishing violators and deterring future environmental crimes.[7] With extremely high stakes for reducing the impact of water pollution crime throughout the United States (U.S.), fully understanding how the U.S. criminally prosecutes water

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2 *Duke Energy Fined $102 Million in Coal Ash Spill*, CBS NEWS (May 14, 2015), https://www.cbsnews.com/news/duke-energy-fined-102-million-in-coal-ash-spill/.

3 *Id.*; U.S. Clean Water Act, 33 U.S.C. §§ 1251–1389 (1972).

4 CBS NEWS, *supra* note 2.

5 Sonal Patel, *Duke Energy Reaches $1.1B Deal to Resolve North Carolina Coal Ash Cost Issues*, POWER MAG. (Jan. 28, 2021), https://www.powermag.com/duke-energy-reaches-1-1b-deal-to-resolve-north-carolina-coal-ash-cost-issues/.

6 *See* discussion *infra* Section II.

7 Memorandum from Earl E. Devaney, Dir., Off. of Crim. Enf't on the Exercise of Investigative Discretion to All EPA Employees Working in or in Support of the Criminal Enforcement Program, 3–4 (Jan. 12, 1994), https://www.epa.gov/sites/production/files/documents/exercise.pdf (providing factors distinguishing cases that merit criminal investigation); Michael J. Lynch, *The Sentencing/Punishment of Federal Environmental/Green Criminal Offenders, 2000-2013*, 38 DEVIANT BEHAV. 991, 991–92 (2017).

pollution crimes is imperative. Yet, we have a limited empirical understanding of how federal agencies investigate and prosecute water pollution crimes, particularly those committed by companies.[8]

This article advocates for developing a broader empirical understanding water pollution crimes under the CWA and examines 2,728 environmental crime prosecutions stemming from Environmental Protection Agency (EPA) criminal investigations conducted between 1983 and 2021. This analysis focused on all CWA criminal prosecutions against companies and explores themes in both prosecutions and penalties to provide the most systematic understanding of this phenomenon to date. The article begins with a brief discussion of the CWA, including compliance monitoring and criminal provisions. The article then reviews the history of environmental criminal enforcement before discussing our data, approach, and findings. The article concludes by emphasizing the importance of enhancing resources for environmental law enforcement agencies.

II. BACKGROUND ON THE CWA

The CWA authorizes EPA to regulate discharges into navigable waters of the U.S.[9] The primary thrust of the CWA is regulating discharges from point sources— industrial facilities, wastewater treatment plants, concentrated animal feeding operations (CAFOs), and other stationary sources—and nonpoint sources, which are more diffuse and do not

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[8] *See* Joshua Ozymy and Melissa L. Jarrell, *Illegal Discharge: Exploring the History of the Criminal Enforcement of the U.S. Clean Water Act*, 32 FORDHAM ENV'T L. REV. 195, 207–08 (2021) [hereinafter Ozymy & Jarrell, *Illegal Discharge*].

[9] *See* 33 U.S.C. § 1251(d) (providing that "the Administrator of the Environmental Protection Agency . . . shall administer this [Act]"); *see also* Ozymy & Jarrell, *Illegal Discharge*, *supra* note 8, at 198–99 (noting the CWA's history and that revisions to the CWA in 1977 and 1987 "gave the EPA significant authority to develop a regulatory framework for discharges of pollutants into the waters of the United States"); *see also History of the Clean Water Act*, ENV'T PROT. AGENCY, https://www.epa.gov/laws-regulations/history-clean-water-act (last updated June 22, 2023).

have a consistent, static source.[10] EPA primarily manages discharges from point sources through a permitting system, known as the National Pollution Discharge Elimination System (NPDES), but developing an effective permitting system for nonpoint sources has proven much more difficult.[11] In lieu of permitting like the NPDES program, EPA monitors nonpoint source water pollution through the National Nonpoint Source Monitoring Program, which oversees and documents the feasibility of controlling nonpoint source pollution as well as assesses the effectiveness of potential control technologies.[12]

The major statutory provisions of the CWA are organized into six Titles: Title I sets broad goals and establishes pollution control programs; Title II outlines the program for funding public water treatment works; Title III establishes the need for effluent discharge standards, nonpoint source management programs, and standards of enforcement; Title IV creates permitting and licensure requirements for point sources of water pollution; Title V creates whistleblower protections and citizen lawsuit provisions; and Title VI creates the Clean Water State Revolving Funds.[13]

The CWA also strengthened EPA's ability to manage wastewater quality standards through programs that fund public wastewater treatment facilities and other water quality

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[10] *See* CWA § 502(14), 33 U.S.C. § 1362(14) (defining a point source as: "any discernible, confined and discrete conveyance. . ."); *Basic Information About Nonpoint Source (NPS) Pollution*, ENV'T PROT. AGENCY, https://www.epa.gov/nps/basic-information-about-nonpoint-source-nps-pollution (last updated Dec. 4, 2023) (explaining that nonpoint source pollution is any source of water pollution that does not meet the definition of a "point source").

[11] *See generally* Kathrine Klaus, *The Conduit Theory: Protecting Navigable Waters from Discharges to Tributary Groundwater*, 43 VT. L. REV. 871 (2019); Justin Rheingold, *Digging Deep: The Clean Water Act's Applicability to Groundwater Discharges*, 60 B. C. L. REV. 311 (2019).

[12] *National Nonpoint Source Monitoring Program*, ENV'T PROT. AGENCY, https://www.epa.gov/nps/national-nonpoint-source-monitoring-program (last updated July 8, 2021).

[13] CLAUDIA COPELAND, CONG. RSCH. SERV., RL30030, CLEAN WATER ACT: A SUMMARY OF THE LAW 7–10 (2016).

infrastructure projects across the country.[14] Under this funding program, EPA provided expertise and Congress appropriated seventy-five percent of funding to create or upgrade facilities in return for accepting certain rules, regulations, and oversight.[15]

III. ENFORCING THE CWA

General compliance monitoring under the CWA requires cooperation between EPA, state, local, and tribal regulatory agencies, with many aspects of compliance delegated to the states.[16] EPA's compliance monitoring strategy focuses on the following areas: wastewater management under NPDES permits; overflows and stormwater management; the National Pretreatment Program; discharges from CAFOs; biosolids; CWA Section 404 permits; and oil spills and spill prevention.[17]

If a regulated entity does not comply with the CWA, EPA and delegated state programs focus on returning companies to compliance by applying administrative or civil tools.[18] Administrative remedies can include issuing notices of violations, fines, or orders of correction to fix any non-compliance issue.[19] The agency may also pursue a civil lawsuit, which could subject the regulated party to liability for a CWA violation and the court may require the party to admit fault, pay penalties, and comply with injunctive relief.[20] Alternatively, a party may seek a negotiated settlement with the agency and

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14 Jonathan Ramseur & Mary Tiemann, Cong. Rsch. Serv., RL96647, Water Infrastructure Financing: History of EPA Appropriations 1 (2019).

15 *Id.*; *see also About the Clean Water State Revolving Fund (CWSRF),* ENV'T PROT. AGENCY, https://www.epa.gov/cwsrf/about-clean-water-state-revolving-fund-cwsrf (last updated Jan. 10, 2024).

16 *See Clean Water Act (CWA) Compliance Monitoring,* ENV'T PROT. AGENCY, https://www.epa.gov/compliance/clean-water-act-cwa-compliance-monitoring (last updated Feb. 22, 2024).

17 *Id.*

18 *Basic Information on Enforcement*, ENV'T PROT. AGENCY, https://www.epa.gov/enforcement/basic-information-enforcement (last updated Feb. 7, 2024).

19 *Id.*

20 *Id.*

potentially enter into a consent decree to regain compliance and possibly avoid admitting guilt.[21] Settlements can be broad and may require the regulated entity to pay for past or future damages or undertake certain actions to do so; impose temporary or permanent environmental mitigation or monitoring plans, which prevent a defendant from engaging in certain actions; or undertake a supplemental environmental project, which requires an entity to provide remedies above and beyond compliance.[22]

Prosecuting environmental crimes harkens back to the founding of the Department of Justice's (DOJ) Public Lands Division in 1909, the forerunner to the Environment and Natural Resources Division (ENRD).[23] But the 1970s represented a watershed moment in federal environmental law with the passage of major environmental statutes including the CWA, Resource Conservation and Recovery Act (RCRA), Toxic Substances Control Act (TSCA), and the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), as well as the creation of the EPA to oversee these laws.[24] By the end of the decade, a broader global movement recognized the extensive harms caused by pollution and the need to develop

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[21] *Id.*

[22] *Id.*; *see also* Memorandum from Robert Van Heuvelen, Dir., Off. Of Regul. Enf't on Guidance on Use of Penalty Policies in Administrative Litigation to Reg'l Counss., Regions I-X; Dir., Off. Of Env't Stewardship, Region I; Dir., Compliance Assurance & Enf't Div., Region VI; Dir., Off. Of Enf't, Compliance & Env't Just., Region VIII; Reg'l Enf't Coordinators, Regions I-X (Dec. 15, 1995), https://www.epa.gov/sites/default/files/documents/gpoladminlitig-mem.pdf; *see also* Memorandum from Lawrence E. Starfield, Acting Assistant Adm'r, U.S. Env't Prot. Agency on Using All Appropriate Injunctive Relief Tools in Civil Enforcement Settlements to Reg'l Counss. & Deputies; Enf't and Compliance Assurance Div. Dirs. & Deputies; Off. of Enf't and Compliance Assurance Off. Dirs. & Deputies 2–3 (Apr. 26, 2021), https://www.epa.gov/sites/default/files/2021-04/documents/usingallappropriateinjunctiverelieftoolsincivilenforcementsettlement0426.pdf.

[23] *History*, ENV'T & NAT. RES. DIV., U.S. DEP'T OF JUST., https://www.justice.gov/enrd/history (last updated Sept. 14, 2023).

[24] RCRA, 42 U.S.C. §§ 6901–6992 (1976); TSCA, 15 U.S.C. § 2601 (1976); FIFRA, 7 U.S.C. §§136-136y; *EPA History: Federal Insecticide, Fungicide and Rodenticide Act*, ENV'T PROT. AGENCY, https://www.epa.gov/history/epa-history-federal-insecticide-fungicide-and-rodenticide-act (last updated June 7, 2023).

stronger tools to reduce environmental harm.[25]

By the 1980s, the development of criminal provisions in federal statutes—first with RCRA in 1984, then the CWA in 1987, and the Clean Air Act in 1990—increased the penalties in environmental law.[26] DOJ's Environmental Crimes Section (DOJ-ECS) was founded in 1982 within ENRD, becoming its own Unit in 1987, and focused on developing specialization in prosecuting environmental crimes.[27]

In 1981, the founding of the Office of Enforcement in EPA institutionalized the policing of environmental crimes—that office is now the Office of Compliance Assurance.[28] In 1982, full-time criminal investigators, also known as Special Agents, were hired, and they received full law enforcement authority in 1988.[29] EPA's Criminal Investigation Division (EPA-CID) is responsible for policing environmental crimes, and the Pollution Prosecution Act bolstered its resources in 1990, setting a minimum of 200 criminal investigators.[30]

In practice, the process for investigating and prosecuting environmental crimes is collaborative. EPA Special Agents build cases from an array of sources, such as civil inspection reports, regulatory filings or reports, former employees of regulated companies,

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25 *See* Michael R. Pendleton, *Beyond the Threshold: The Criminalization of Logging*, 10 SOC'Y & NAT. RES. 181, 191–93 (1997) (discussing the inclusion of serious environmental penalties to the Canadian Forest Code).

26 *Historical Development of Environmental Criminal Law*, ENV'T & NAT. RES. DIV., https://www.justice.gov/enrd/about-division/historical-development-environmental-criminal-law (last updated Sept. 12, 2023).

27 *Id.*

28 *About the Office of Enforcement and Compliance Assurance (OECA)*, ENV'T PROT. AGENCY, https://www.epa.gov/aboutepa/about-office-enforcement-and-compliance-assurance-oeca (last updated Jan. 31, 2024).

29 ENV'T PROT. AGENCY, Criminal Enforcement Program 9, (2011), https://www.epa.gov/sites/default/files/documents/oceft-overview-2011.pdf.

30 The Pollution Prosecution Act of 1990, Pub. L. No. 101-593, § 202, 104 Stat. 2954, 2962 (1990) (codified at 42 U.S.C. § 4321).

and whistleblowers.[31] Prosecutions often undertake a taskforce structure with state, local, and federal criminal agents involved in the process. Agents build cases then work with prosecutors, generally within DOJ-ECS or the U.S. Attorney's Office, who will decide whether to file a federal criminal indictment or convene a grand jury. [32]

Criminal provisions of the CWA center on negligent and knowing violations of law, and statutory penalties may apply on a per day basis for violations.[33] Penalties for knowingly violating the law are the most severe.[34] Criminal provisions under the CWA include: negligently or knowingly directly discharging a pollutant from a point source to waters of the U.S.; negligently or knowingly discharging harmful quantities of oil or a hazardous substance to waters of the U.S.; failing to report discharges of oil or a hazardous substances; negligently or knowingly discharging to a publicly owned treatment work (POTW) in violation of any effluent or pretreatment standard; negligently or knowingly discharging to a POTW and causing the facility to violate its permit; knowingly committing a specific offense and putting another person in imminent danger of death serious bodily injury; knowingly making a false material statement in any CWA document; knowingly tampering with a monitoring device or method; and violating the Rivers and Harbors Act, Marine Protection, Research, and Sanctuaries Act (Ocean Dumping Act), or the Act to Prevent Pollution from Ships.[35]

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31 *See* Joel A. Mintz, *Treading Water: A Preliminary Assessment of EPA Enforcement During the Bush II Administration*, 34 ENV'T L. REP. 10912, 10916–25 (2004); *see also Criminal Enforcement's Intergovernmental Partnerships*, ENV'T PROT. AGENCY, https://www.epa.gov/enforcement/criminal-enforcements-intergovernmental-partnerships (last updated Oct. 11, 2023).

32 *See* Joel A. Mintz, *Some Thoughts on the Interdisciplinary Aspects of Environmental Enforcement*, 36 ENV'T L. REP. 10495, 10497 (2006).

33 33 U.S.C. § 1319(c).

34 *See Criminal Provisions of Water Pollution*, ENV'T PROT. AGENCY, https://www.epa.gov/enforcement/criminal-provisions-water-pollution (last updated Nov. 1, 2023).

35 *Id.*

IV. EMPIRICAL LITERATURE ON CRIMINAL SANCTIONING

Whether enforcing criminal environmental laws effectively deters environmental crimes is the subject of ongoing debate. The main criticism of criminal enforcement in this area is that there are too few investigators and too little resources devoted to prosecuting environmental crimes to sufficiently detect environmental crimes—this sparse enforcement scheme does not increase the possibility of detection enough to deter criminal behavior.[36] Further, historically, most cases that are prosecuted do not result in very large penalties, which exacerbates the issue because even the entities that are caught violating the law are not punished severely.[37]

These concerns are contextualized within the broader environmental regulatory scheme, where civil and administrative penalties are more common than criminal tools and more efficiently support EPA's goals of regaining compliance.[38] Also, practically, prosecutors are often motivated to pursue the most egregious cases and seek appropriate penalties, and those cases tend to involve aggregating factors.[39] Further, empirical studies of criminal enforcement show that crime severity is the best general predictor of penalties in environmental crime prosecutions.[40]

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36 Michael J. Lynch et al., *The Weak Probability of Punishment for Environmental Offenses and Deterrence of Environmental Offenders: A Discussion Based on USEPA Criminal Cases, 1983-2013*, 37 DEVIANT BEHAV. 1095, 1096–99, 1107 (2016) ("results suggest that there are few criminal prosecutions, and that those few prosecutions are not rationally sufficient to produce deterrence.").

37 Joshua Ozymy et al., *Persistence or Partisanship: Exploring the Relationship between Presidential Administrations and Criminal Enforcement by the U.S. Environmental Protection Agency 1983-2019*, 81 PUB. ADMIN REV. 49, 58–59 (2020).

38 *See* Memorandum from Earl E. Devaney, *supra* note 7, at 2 ("Congressional intent underlying the environmental criminal provisions is unequivocal: criminal enforcement authority should target the most significant and egregious violators.").

39 David M. Uhlmann, *Prosecutorial Discretion and Environmental Crime*, 38 HARV. ENV'T L. REV. 159, 164–66 (2014).

40 Joshua Ozymy & Melissa Jarrell, *Why do Regulatory Agencies Punish? The Impact of Political Principals, Agency Culture, and Transaction Costs in Predicting Environmental Criminal Prosecution Outcomes in the United States*, 33 REV. OF POL'Y RSCH. 71, 71–73 (2016).

While the deterrent value of criminal prosecution for environmental crimes in the U.S. is still an open empirical question, a few studies specifically examined the prosecution of companies for water pollution crimes.[41] The data in this paper is one of these studies. This study examines companies prosecuted for water pollution crimes under the CWA by analyzing 2,728 criminal environmental prosecutions undertaken since 1983. The data shows patterns over an extensive span of time, which clarifies what cases prosecutors pursue and whether and how companies are punished.

V. DATA AND ANALYSIS

Data for this study is from EPA's Summary of Criminal Prosecutions Database.[42] The database contains information on all EPA-CID criminal investigations that lead to prosecution since 1983.[43] To gather the data, study authors searched the database by fiscal year (FY), then searched and cataloged all prosecutions, from the first case in the data through April 30, 2022. The total data included 2,728 prosecutions. From these cases, study authors selected all cases that were prosecuted under the CWA, then further selected for all cases involving the prosecution of companies for CWA crimes. Some cases involve the prosecution of wastewater treatment plants—these are included in the data as the case summary information does not reveal whether these are private or public entities. Either way, the cases are not so frequent nor penalties severe enough to affect the outcomes or conclusions herein.

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41 *See* Carole M. Billiet & Sandra Rousseau, *How Real is the Threat of Imprisonment for Environmental Crime?*, 37 EUR. J. L. & ECON 183, 188 (2014).

42 *Summary of Criminal Prosecutions Database*, ENV'T PROT. AGENCY, https://www.epa.gov/enforcement/summary-criminal-prosecutions (last updated June 16, 2023).

43 Joshua Ozymy & Melissa Jarrell Ozymy, *Evaporating Into Thin Air: The Prosecution of Air Pollution Crimes During the Trump Administration*, 11 MICH. J. ENV'T. & ADMIN. L. 233, 241 (2022).

Data in this analysis includes all 494 prosecutions that met these criteria. From each case, authors recorded the following data from the narrative summaries: docket number, fiscal year identifier, presence of a company as a named defendant in the prosecution, state where the crime took place, number of named defendants, description of the case, all sentencing data parceled out to individual and companies including probation (in total months), and all monetary penalties, such as fines, assessments, restitution, or community service payments.

To arrange and understand the data, authors used two coders that coded the data independently, first conducting a test pilot for four weeks to better understand patterns in the data and to deal with coding issues as they arose. After developing a stronger understanding of the data, coding continued. One of the authors reviewed discrepancies and revised the codes until all values matched. Most data coding was straightforward and discrepancies between coders were mostly found with complex sentencing data involving multiple defendants. Inter-coder reliability for the data was about ninety-five percent. [44]

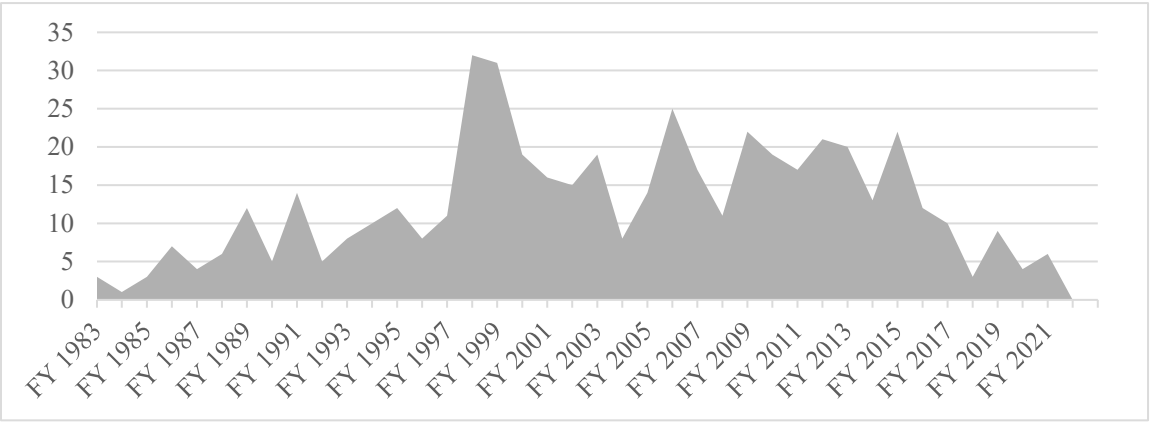
VI. FINDINGS

Figure 1 tracks the annual number of prosecutions of companies for CWA crimes from 1983 to 2021, by fiscal year. In 1983, 3 cases were adjudicated, in 1984 1 case was adjudicated, and 36 cases were adjudicated by the end of the decade. In the 1990s, prosecutions substantially increased, with 136 adjudicated during the decade and a high mark of 32 prosecutions in 1998. From 2000 to 2009, prosecutions continued to increase, with 166 adjudicated by the end of the decade and a high point of 25 in 2006. From 2010–

[44] *See* Cliodhna O'Conner & Helene Joffe, *Intercoder Reliability in Qualitative Research: Debates and Practical Guidelines*, 19 INT'L J. OF QUALITATIVE METHODS 1, 9–10 (2020).

2021, prosecutions began to decline, with 156 adjudicated during this period and a high mark of 22 in 2015. Our analysis covers a grand total of 494 adjudications against companies for CWA crimes.

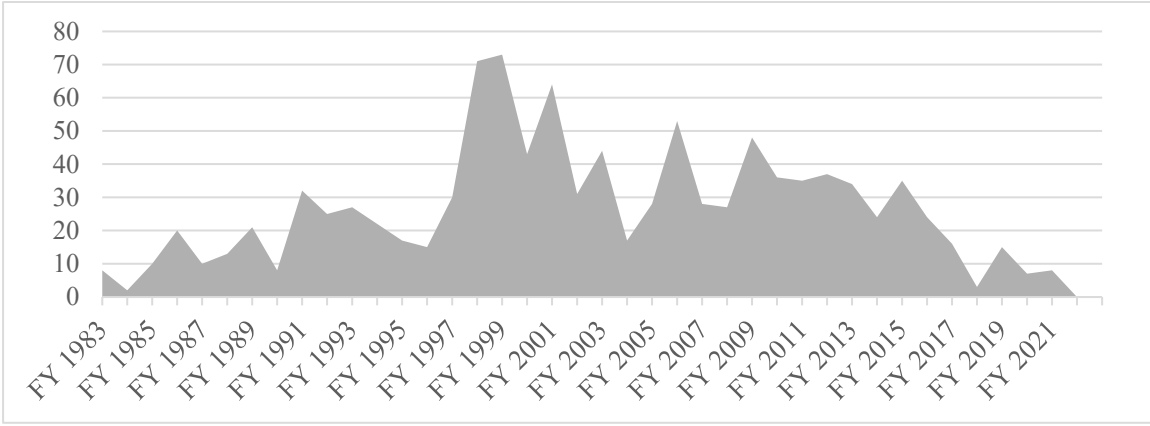
Figure 1. Total Prosecutions under the CWA Involving Companies, by Fiscal Year



Source: *EPA Summary of Criminal Prosecutions Database*

Figure 2 shows the total number of defendants prosecuted annually when companies violated the CWA. Both individuals and companies are included in the count to give a broader sense of total defendants in these prosecutions. In 1983, 8 defendants were prosecuted, 20 defendants in 1986, and 21 in 1989, with a total of 84 during the decade. In the 1990s, the number of defendants increased to 320 defendants prosecuted during the decade, with a high point of 32 in 1991. From 2000 to 2009, the number of defendants increased to 383, with a high point of 64 in 2001. From 2010-2021, defendants decreased to 274 with a high mark of 37 in 2012. A grand total of 1,061 defendants were prosecuted when companies were prosecuted for CWA crimes in our data.

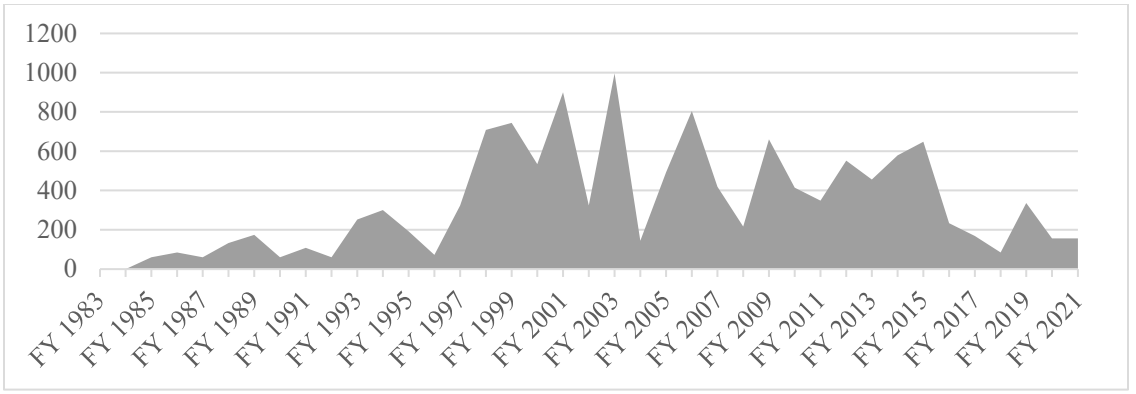
Figure 2. Number of Defendants in CWA Prosecutions Involving Companies, by Fiscal Year.



Source: *EPA Summary of Criminal Prosecutions Database*

Figure 3 tracks the total number of months of probation assessed to companies at sentencing by fiscal year, 1983 to 2021. There were 60 months of probation time assessed in 1985, 132 in 1988, and 174 months in 1989, for a total of 510 months of probation assessed during the decade. Probation upticked considerably in the 1990s as prosecutions as a whole increased. There were 252 months of probation assessed in 1993, 300 in 1994, and a high point of 744 months of probation assessed in 1999. During the decade, courts assessed a total of 2,820 months of probation against companies. A significant increase in probation is uncovered from 2000 to 2009, with 900 months assessed in 2001, 996 in 2003, and a total of 5,489 months during the decade assessed at sentencing. Probation decreased on the whole from 2010 to 2021, with 552 months assessed in 2012, 648 months in 2015, and 156 months in 2020, with a total of 4,130 months assessed to companies during the decade. A grand total of 12,949 months of probation were assessed to defendants in our data.

Figure 3. Total Probation Time in Months Assessed to Companies in CWA Prosecutions, by Fiscal Year.

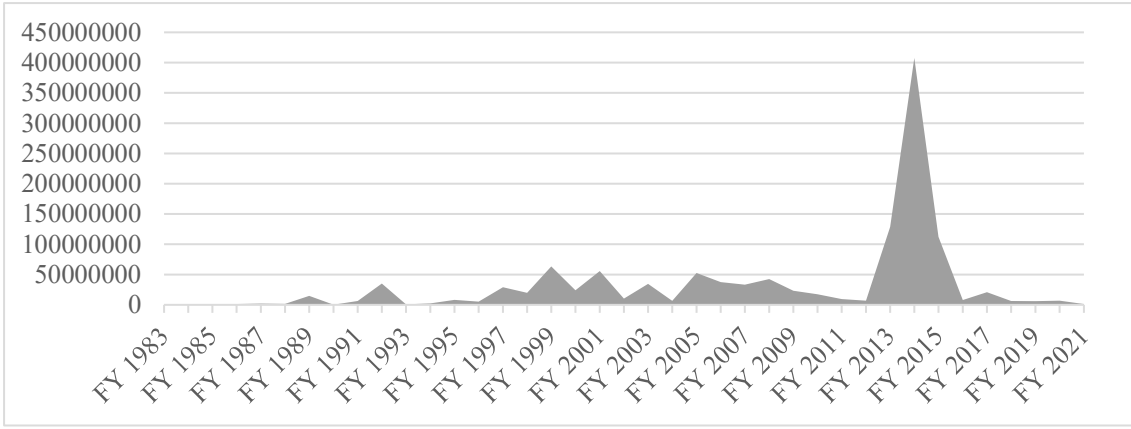


Source: *EPA Summary of Criminal Prosecutions Database*

Figure 4 explores total monetary penalties assessed to companies in our analysis by fiscal year, 1983 to 2021. Monetary penalties increased throughout the decade, with over $20 million assessed to companies during this period. By the 1990s, penalties increased significantly to over $2.3 million in 1994, over $19 million in 1998, and a total exceeding $170 million in the decade. From 2000 to 2009, penalties continued to increase, with penalties over $10 million in 2002, $50 million in 2005, and $42 million in 2008, with a total exceeding $320 million during the decade. From 2010 to 2021, penalties increased again, exceeding $731 million during this time period. A grand total of monetary penalties exceeding $1.24 billion were assessed to companies in our analysis.[45]

Figure 4. Total Monetary Penalties Assessed to Companies in CWA Prosecutions, by Fiscal Year.

[45] *See Summary of Criminal Prosecutions*, ENV'T PROT. AGENCY, https://cfpub.epa.gov/compliance/criminal_prosecution/index.cfm?bct=19&pt=1 (last visited Feb. 18, 2024). These penalties are affected by outliers discussed in the following tables. The largest penalty for a CWA violation is the case against British Petroleum for their negligence leading to the *Deepwater Horizon* oil spill in the Gulf of Mexico. *See id*. For an unknown reason, the case is not included in the EPA database through normal searching, only discoverable by web search. Because this would violate our protocols on coding, we do not include it in the totals.



Source: *EPA Summary of Criminal Prosecutions Database*

The second section of this analysis provides context to the broader patterns in prosecutions and penalties for companies under the CWA by discussing key cases that affect probation and monetary penalties assessed to companies in our data. Table 1 shows the top probation penalties assessed to companies. Probation is fairly evenly distributed across the data, and one particular case does not greatly affect outcomes on the whole. Statutory maximums tend to limit total probation assessed for a particular crime, so Table 1 lists the top three cases in the data in the table.[46]

Table 1. Largest Corporate Probation Sentences in CWA Prosecutions.

Defendant	***Fiscal Year***	***Crime***	***Total Probation (Months)***
Johnson Properties	2001	Illegal Discharge/False Reporting	360
Bunker Group, Inc.	1997	Illegal Discharge	180
Blue Marsh Laboratories	2014	False Reporting	180

Source: *EPA Summary of Criminal Prosecutions Database*

Johnson Properties, Utilities Management Services Inc., and eight other co-

[46] *Criminal Provisions of Water Pollution*, *supra* note 34.

defendants were charged for failing to properly operate water treatment facilities.[47] Between 1991 and 1998, the companies failed to operate these facilities, conspired to lie to investigators, and issued false discharge monitoring reports.[48] The defendants were charged with a variety of crimes, including conspiracy and obstruction, and the companies were collectively sentenced to serve 580 months of probation, as well as other penalties.[49]

Bunker Group, Inc., Bunker Group Puerto Rico, and New England Marine Services were prosecuted when a tank barge owned by the defendants was improperly towed and spilled 750,000 gallons of oil into the water.[50] The companies were charged with illegal discharge under the CWA and were each sentenced to sixty months of probation.[51]

Blue Marsh Laboratories was prosecuted for providing false analytical results for environmental sampling on a variety of occasions.[52] The defendants were charged with conspiracy, false statements, and violations of the CWA, and they were each sentenced to sixty months of probation.[53]

Table 2 displays the top monetary penalties assessed at sentencing. Unlike

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47 Press Release, Dep't of Just. Env't and Nat. Res. Div., Utility Company Admits it Conspired To Violate Clean Water Act, Agrees to Pay $4.3 Million Fine (Jan. 13, 2000).

48 Press Release, Env't Prot. Agency, Louisiana Johnson Properties Company President, Two Employees Plead Guilty in Water Case (Feb. 10, 2000).

49 *See Summary of Criminal Prosecutions*, ENV'T PROT. AGENCY, *https://cfpub.epa.gov/compliance/criminal_prosecution/index.cfm?action=3&prosecution_summary_id=1051&searchParams=M5%2C%3A%2FXT%2A%5CCYZ%40JZ%5DIWY45%3DXBI%3EX%3A%29M%3B%5CSK%25%29%3F%5F%5B%202%2CU%227G9V%5CESMLK%2A%22%2CKA%5DQ%0AM%3DG%22D6%21%28%3D%2B%292%3D3JGFYMRV%40JV%2FK%2AW2FQ%206%5EA%2A4%5E7%21WDSYDS%5BL3CY%40%3D%2DI%3E%2BC%40%216%0AM%24%287%3B%5E%26S%5DMV8%24I9%2FO%25Y%5D%29%40FN%2075%2F%3D3TVEFQVXG%3D%27ZWXQB%2F%2B%2AN%3BE%26L%3E9%3C%3D%5CH%2D%2A%0A%2D7%29%23%2F2HVTGY%5E4G72%3AJ%20%20%20%0A (last visited Feb. 23, 2024*).

50 *Vessel Pollution and Related Maritime Offenses, 1989-2004*, 61 THE COAST GUARD J. OF SAFETY AT SEA: PROCS. OF THE MARINE SAFETY & SEC. COUNCIL 25, 32 (2005) (detailing the initial criminal case against a company for sending an unworthy vessel to sea).

51 *Id.*

52 Press Release, U.S. Att'y Off.—Eastern Dist. of Pa., Environmental Testing Lab and Owner Sentenced for Falsifying Test Results (Sept. 10, 2012).

53 *Id.*

probation, a few significant penalties greatly affect the sentencing outcomes here. For example, first, the largest fine in the data was assessed to Transocean, LTD for its role in the Deepwater Horizon disaster in the Gulf of Mexico.[54] The company pled guilty to CWA violations, and the court ordered the company to pay $400 million in fines and penalties.[55] Second, Wal-Mart California was prosecuted for failing to have a proper hazardous waste management plan.[56] Wal-Mart illegally discarded hazardous wastes in trash bins, transported hazardous wastes to unauthorized facilities, and dumped hazardous wastes down the drain into the sewer system. The federal government charged the company with violating the CWA, and the court ordered the company to pay some $110 million in fines.[57] Third, Duke Energy Progress, Inc. was prosecuted for a significant coal ash spill into the Dan River in North Carolina.[58] The company pled guilty to CWA violations.[59] Duke Energy agreed to pay a $68 million criminal fine and spend $34 million on environmental projects, for a total of $102 million in monetary penalties.[60] Fourth, Evergreen International SA was prosecuted for failing to keep an accurate Oil Record Book for oily wastewater and sludge, as well as for its employees' false statements to the U.S. Coast Guard related to those illegal overboard discharges.[61]

Table 2. Largest Corporate Monetary Penalties in CWA Prosecutions.

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54 *Transocean Settlement*, ENV'T PROT. AGENCY, https://www.epa.gov/enforcement/transocean-settlement (last updated Nov. 28, 2023).

55 *See* Joshua Ozymy & Melissa J. Ozymy, *From Austin to Santa Fe: Exploring the Prosecution of Environmental Crimes Within EPA Region 6*, 63 NAT. RES. J. 314, 329 (2023).

56 Press Release, Off. of Pub. Affs., Wal-Mart Pleads Guilty to Federal Environmental Crimes, Admits Civil Violations and Will Pay More Than $81 Million (May 28, 2013).

57 *Id.*

58 Press Release, Off. of Pub. Affs., Duke Energy Subsidiaries Plead Guilty and Sentenced to Pay $102 Million for Clean Water Act Crimes (May 14, 2015).

59 *Id.*

60 *Id.*

61 Press Release, Env't Prot. Agency, Evergreen to Pay Largest-Ever Penalty for Concealing Vessel Pollution: Container Shipping Company to Pay $25 Million (Apr. 4, 2005).

Defendant	*Fiscal Year*	*Crime*	*Total Monetary Penalties*
Transocean, LTD.	2014	Unpermitted Discharge	$400,000,000
Wal-Mart California	2013	Unpermitted Discharge	$110,000,000
Duke Energy Progress, Inc.	2015	Unpermitted Discharge	$102,000,000
Evergreen International, SA	2005	Unpermitted Discharge	$30,000,000

Source: *EPA Summary of Criminal Prosecutions Database*

Table 3 includes prosecutions organized by type of violation. Here, authors identified the primary crime at the heart of the case and categorized the case appropriately. The goal was to discern whether general themes exist across the cases. For CWA prosecutions, cases were organized into four primary themes that generally defined the crime at the center of the prosecution. These themes include: unpermitted discharges, the illegal alteration of waterways or wetlands, false reporting/false statements, and tampering with a monitoring device.

Table 3. Dominant Themes that Emerge when Companies are Prosecuted for CWA Crimes.

Theme	*Number of Prosecutions*	*Percentage of Total*[62]
Unpermitted Discharge	435	88
False Reporting	41	8
Illegal Alteration of Waterways and Wetlands	11	2
Tampering with a Monitoring Device	6	1
Unknown[63]	1	
Total	494	

[62] Percentages are rounded.
[63] In one case, the primary crime is unclear.

In eighty-eight of prosecutions analyzed, the primary crime centered around an illegal discharge of water pollution. These cases primarily involved (1) discharges into POTWs or a public sewer system or (2) illegally dumping or discharging oil or other wastes into the ocean, a lake, or the navigable waters of the U.S. For example, in the 1980s, candle-making factory Will & Baumer Inc., discharged pollutants into a local creek without notifying officials.[64] Will & Baumer was charged with failure to report under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and discharging without a permit under the CWA, among other charges.[65] The company was sentenced to pay a $360,000 fine, a $225 special assessment, and serve thirty-six months of probation.[66]

In eight percent of prosecutions, the primary crime revolved around false statements or false reporting. This category included providing false statements to government officials and lying on official documents. Other cases involved falsifying laboratory samples for wastewater or failing to properly report the results of wastewater testing or other environmental tests.[67]

In two percent of prosecutions, the primary crime centered on the illegal obstruction or alternation of waterways or wetlands. Altering waters of the U.S. typically requires a

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64 ENV'T PROT. AGENCY, NAT'L ENF'T INVESTIGATIONS CTR., SUMMARY OF CRIMINAL PROSECUTIONS RESULTING FROM ENVIRONMENTAL INVESTIGATIONS 5 (1989).

65 *Id.*

66 *Id.*

67 *See, e.g.*, Press Release, Env't Prot. Agency, Man Who Served Year in Prison for Environmental Fraud Conviction Indicted Again (Apr. 1, 2005) (discussing the case of Phase II Labradorites, Inc. and Michael Klusaritz, who were prosecuted for making false statements under the CWA and fraud and were held jointly liable for $40,000); *see also* Press Release, U.S. Att'y's Office, Southern District of Ohio, Mining Co. Sentenced For EPA Violations (July 23, 2015) (discussing the prosecution of Oxford Mining Company, LLC which was charged under the CWA and sentenced to pay a $500,000 fine and make a $150,000 community service payment).

CWA Section 404 dredge or fill permit.[68] This often includes activities like building dams and levees, building docks or bridges, filling in or dredging land for development, and mining or extraction projects.[69]

In about one percent of cases, the primary crime centered on tampering with a monitoring device or method. These crimes involved manipulating, rendering inoperable, or bypassing a monitoring device to illegally discharge pollution.[70]

VII. DISCUSSION

This analysis of companies prosecuted for CWA violations has yielded a few clear and important conclusions. First, prosecutors secured significant penalties against companies for water pollution crimes. While over half of the total monetary penalties assessed at sentencing resulted from only four prosecutions, prosecutors secured significant penalties over time. Although not every prosecution can result in a $400 million criminal penalty, as in the case of the Transocean prosecution, such punitive measures are not always needed. In fact, in about twenty-three of prosecutions studied, prosecutors secured at least $1 million in penalties, a significant accomplishment.

Second, prosecutors primarily pursued crimes involving significant harm or culpable conduct. While it is difficult to quantify such a finding from assessing probation or monetary penalties, many of the cases prosecutors chose to pursue addressed knowing or negligent violations. As a rough empirical measure, we find that 132 prosecutions (about

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68 *See Permit Program under CWA Section 404*, ENV'T PROT. AGENCY, https://www.epa.gov/cwa-404/permit-program-under-cwa-section-404 (last updated Apr. 11, 2024).

69 *Id.*

70 Joshua Ozymy & Melissa L. Jarrell, *Illegal Discharge: Exploring the History of the Criminal Enforcement of the U.S. Clean Water Act*, 32 FORDHAM ENV'T L. REV. 195, 228 n.65 (2021) (discussing Sea Watch International, which was prosecuted for tampering with a monitoring device at its wastewater treatment plant to hide effluent limits that violated permitted levels).

27% of cases in our data) resulted in additional criminal charges, such as false statements, conspiracy, obstruction, and other crimes that suggest criminal intent.[71]

Third, and finally, prosecuting companies for CWA crimes has declined over time. The high points for annual prosecutions peaked in the late 1990s and early 2000s and have declined since—aside from a few high-profile prosecutions discussed above. This trend might indicate a broader trend to avoid prosecuting environmental crimes, or it might be a consequence of changing political values and executive branch politics.[72] This also might be due to declining resources and lack of political agreement on regulating pollution and business, which has developed in the last two decades.

VIII. CONCLUSION

Since the mid-1990s, environmental law enforcement agents have been forced to adapt their practices because of inconsistent political support over different years and presidential administrations. While enough bipartisan support created and implemented environmental law enforcement resources in the early 1980s, by the time Bill Clinton became president in 1993, environmental protection became a partisan issue. While agencies adapted to changing executive policies, they have hardly thrived. In an era where climate change, particularly in the Obama and Biden Administrations, has risen to the top of the environmental agenda, criminal enforcement is a key tool to deter and punish companies for serious violations of environmental laws generally. The difficulties of

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71 *See generally* David M. Uhlmann, *Prosecutorial Discretion and Environmental Crime Redux: Charging Trends, Aggravating Factors, and Individual Outcome Data For 2005-2014*, 8 MICH. J. ENV'T. & ADMIN. L. 297 (explaining the role of aggravating factors and prosecutors seeking charges against serious crimes in criminal environmental cases).

72 *Fewer Criminal Prosecution of Environmental Crimes Under Trump*, TRAC REPORTS (Oct. 29, 2019), https://trac.syr.edu/tracreports/crim/581/.

absorbing extensive new responsibilities, such as managing climate change threats and enhanced protection of environmental justice communities, both necessary and long overdue mandates, will compete with other extensive obligations. It is likely that agencies will not have sufficient resources to adequately pursue all necessary claims.[73]

Funding and political support for environmental law enforcement waned years ago—this is illustrated by EPA's budget, which, when adjusted for inflation, peaked in 1980 at $16 billion.[74] The agency survived budget cuts under the Reagan Administration and had increased resources through the Clinton era, but after that, EPA only received a significant infusion in 2009 and 2010, during the Obama presidency.[75] The 2009 financial crisis exacerbated long-standing trends of substantive decline, and staffing for EPA, which peaked at 18,110 in 1999, declined to 14,172 under the Trump Administration.[76] While Trump was unable to fully dismantle EPA, a significant number of employees left the agency, morale was greatly affected, and many gains from the Obama era were effectively rolled back.[77] For DOJ's ENRD, while the political rhetoric from opponents has been less salient, budgetary support has been stagnant for many years.[78]

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73 *See* Joel A. Mintz, *Neither the Best of Times Nor the Worst of Times: EPA Enforcement During the Clinton Administration*, 35 ENV'T L. REP. 10390 (2005); *see also Environmental Justice in Enforcement and Compliance Insurance*, ENV'T PROT. AGENCY, https://www.epa.gov/enforcement/environmental-justice-enforcement-and-compliance-assurance (last updated Dec. 18, 2023).

74 *EPA's Budget and Spending*, ENV'T PROT. AGENCY, https://www.epa.gov/planandbudget/budget (last updated July 26, 2023); U.S. Inflation Calculator, https://www.usinflationcalculator.com/ (last visited Feb. 23, 2024).

75 *See* Leif Frederickson et al., *History of US Presidential Assaults on Modern Environmental Health Protection*, 108 AM. J. PUB. HEALTH 595 (2018).

76 Emily Holden, *Trump's Environment Agency Seems to be at War With the Environment, Say Ex-Officials*, THE GUARDIAN (Oct. 30, 2020), https://www.theguardian.com/environment/2020/oct/30/trump-agency-war-on-environment-former-epa-officials.

77 Talia Buford, *How the Trump Administration is Reshaping the EPA*, PBS NEWS HOUR (Dec. 19, 2017), https://www.pbs.org/newshour/politics/how-the-trump-administration-is-reshaping-the-epa.

78 DEP'T OF JUST., GEN. LEGAL ACTIVITIES: ENV'T AND NAT. RES. DIV. FY 2024 BUDGET REQUEST (2024) (identifying the stagnant budgets for the ENRD across the last four years).

The Biden Administration's budget commitments might give insight into the future.[79] The Administration's and congress's passage of monumental infrastructure laws have provided $16 billion into "strengthening infrastructure, making communities more resilient to climate change, and protecting human health and the environment."[80] But this does not necessarily address federal enforcement of criminal environmental provisions. To adequately protect the environment generally and ensure environmental law enforcement is effective, the federal government must significantly increase funding for both EPA and ENRD. This will help these agencies meet new mandates regarding environmental justice and climate change while continuing to enforce criminal provisions related to water pollution. If this funding does not change across the board, agencies will likely shift focus towards political goals, but will not be able to adequately manage all responsibilities.

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79 *See* Press Release, Env't Prot. Agency, EPA Celebrates Two Years of Progress Under President Biden's Bipartisan Infrastructure Law (Nov. 15, 2023).

80 *Id.*

Out of Style: How Greenwashing Litigation is Shaking Up the Fashion Industry

By Poonam Agrawal

I. Introduction

Fast fashion, the term used to describe cheap clothing made at rapid speeds to keep

up with current trends, has skyrocketed in the past few years.[1] The industry has been fueled by social media, an increased appetite for up-to-the-minute styles, and a rise in the purchasing power of young consumers, creating a world of shoppers with instant-gratification desires and capabilities.[2] While fast fashion is highly profitable to clothing retailers and makes stylish clothes more affordable to consumers, it also encourages disposable fashion and a "throwaway" mentality, which can have severe environmental consequences.[3]

To combat some of the negative imagery associated with fast fashion, some retailers advertise their clothing products as "sustainable" and "eco-friendly," without defining what these terms mean.[4] In doing so, retailers mislead consumers into buying products that consumers believe are eco-friendly but that instead have a large carbon footprint. This unfortunate behavior by retailers, called "greenwashing," has led to multiple lawsuits brought by the U.S. Federal Trade Commission (FTC), consumers, states, and shareholders.[5]

Despite their mixed success in court, greenwashing lawsuits have initiated structural changes in the fashion industry. This paper explores some of those changes. Section II provides an overview of greenwashing litigation by describing how companies

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1 *See* Adam Hayes, *Fast Fashion Explained and How It Impacts Retail Manufacturing,* INVESTOPEDIA, https://www.investopedia.com/terms/f/fast-fashion.asp (last updated Feb. 13, 2024).

2 *Id.*

3 *Id.*

4 *See* James Miller, *Greenwashing Explained (With 9 Real Life Examples),* THEROUNDUP.ORG (Nov. 1, 2022), https://theroundup.org/greenwashing-explained-examples/.

5 Tian Daphne, *Greenwashing Lawsuits in Businesses: Notable Cases and Consequences (Part 2)*, CIRCULARISE (May 4, 2023), https://www.circularise.com/blogs/greenwashing-lawsuits-in-businesses-part-2; Abigail Gampher Takacs, *Stakeholders to Supplement Agency Greenwashing Efforts*, BLOOMBERG L.: ANALYSIS (Nov. 5, 2023), https://news.bloomberglaw.com/bloomberg-law-analysis/analysis-stakeholders-to-supplement-agency-greenwashing-efforts.

greenwash and offering recent examples of greenwashing lawsuits. Section III examines three different ways greenwashing litigation has started to change the fashion industry, which includes (1) encouraging greater scrutiny of fashion sustainability indexes, (2) inspiring greater legislative action in regulating fashion retailers, and (3) generating greater consumer awareness of the environmental impacts of fast fashion. Section III also explores what steps fashion retailers, legislators, and consumers can take to work toward a more sustainable future.

II. OVERVIEW OF GREENWASHING IN FASHION

The term "greenwashing" refers to a "making an unsubstantiated claim to deceive consumers into believing that a company's products are environmentally friendly or have a greater positive environmental impact than they actually do."[6] Greenwashing is a play on the term "whitewashing," which refers to the use of "false information to intentionally hide a wrongdoing, error, or an unpleasant situation."[7] Companies greenwash to capitalize on the increasing demand for environmentally sound products without taking meaningful measures to become more environmentally friendly.[8] This section provides an overview of greenwashing litigation by (1) describing different ways that companies greenwash, and (2) providing examples of greenwashing lawsuits both in and out of the fashion industry.

A. HOW COMPANIES GREENWASH

Greenwashing can occur in many forms. A company can greenwash by using misleading environmental images on their products.[9] For example, many water bottles

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6 Adam Hayes, *What is Greenwashing? How It Works, Examples, and Statistics,* INVESTOPEDIA, https://www.investopedia.com/terms/g/greenwashing.asp (last updated Jan. 22, 2024).

7 *Id.*

8 *Id.*

9 Miller, *supra* note 4.

include pictures of crystal-clear streams and rivers on their labels, even though single-use water bottles contribute to global plastic waste.[10] Companies also greenwash by using vague terms such as "all natural" and "eco-friendly" in their product advertising, without explaining what these terms mean.[11] Some companies use red herrings to greenwash by making one small part of their product from recyclable materials and then touting the entire product as eco-friendly—like calling non-rechargeable batteries eco-friendly because the package is made from five percent recycled content, despite the battery's potential to leak harmful chemicals.[12] Other companies use bait-and-switch methods.[13] Bait-and-switch greenwashing happens when a company offers a few eco-friendly products to attract environmentally conscious consumers and then later presents them with many more products that are actually not eco-friendly.[14] Finally, some companies use irrelevant claims to greenwash. For example, one deodorant company states that its products are free of chlorofluorocarbons (CFCs), even though Environmental Protection Agency (EPA) regulations already ban the use of CFCs in any product for sale in the United States (U.S.).[15]

In the fashion industry, the most common type of greenwashing involves the use of vague terminology.[16] Clothing retailers use buzzwords like "sustainable," "vegan," "ethical," and "organic," without providing explanation behind the usage of these terms.[17]

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10 *Id.*
11 *Id.*
12 *Id.*
13 *Id.*
14 *Id.*
15 *Id.*; *see, e.g.*, *UltraSure™ Anti-Perspirant & Deodorant*, DERMARITE, https://dermarite.com/product/ultrasure-anti-perspirant-deodorant/ (last visited Mar. 4, 2024).
16 *See* Allyson Chiu, '*Vegan,' 'Sustainable': How to Spot Misleading Fashion Claims*, WASH. POST: CLIMATE SOLS. (Jan. 27, 2023), https://www.washingtonpost.com/climate-solutions/2023/01/25/greenwashing-fashion-clothes-vegan-sustainable/.
17 *Id.*

According to the Chief Marketing Officer for Remake, a global nonprofit focused on climate justice in the clothing industry, there is "no industry agreed-upon or legal definition of sustainability . . . [a]s a result, brands are really defining sustainability based on their own interpretations in order to justify salary, growth, and profit."[18] For example, a company can improve just a single aspect of its supply chain, such as decreasing the amount of water needed to make clothes, and call that product "sustainable."[19]

In reality, the clothing production process tends to be surprisingly bad for the environment.[20] There are four main environmental harms that result from textile production. First, growing materials such as cotton require large quantities of freshwater, and manufacturers use even more water for the textile dyeing and finishing process.[21] This heavy water use has dramatic consequences. For example, cotton overproduction has contributed to the desertification of the Aral Sea.[22] Second, in many countries where garments are produced, manufacturers dump untreated toxic wastewater from textile factories directly into rivers, harming aquatic life and the millions of people living by those riverbanks.[23] Fertilizers from cotton production also pollute nearby water streams.[24] Third,

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18 *Id.*

19 *Id.*

20 Kirsi Niinimäki et al., *The Environmental Price of Fast Fashion*, 1 NATURE REV. EARTH & ENV'T 189, 189 (2020) (discussing the fashion industry's "widespread and substantial" impact on the environment).

21 *Id.* at 191.

22 *Id.* at 192; *see also* A.K. Chapagain et al., *The Water Footprint of Cotton Consumption: An Assessment of the Impact of Worldwide Consumption of Cotton Products on the Water Resources in the Cotton Producing Countries*, 60 ECOLOGICAL ECON. 186, 187 (2006) (noting that from 1960–2000, "the Aral Sea in Central Asia lost approximately 60% of its area and 80% of its volume as a result of the annual abstractions of water from the Amu Darya and the Syr Darya–the rivers which feed the Aral Sea–to grow cotton in the desert.") (internal citations omitted).

23 Rita Kant, *Textile Dyeing Industry: An Environmental Hazard*, 4 NATURAL SCI. 22, 23 (2012).

24 JENS SOTH ET AL., THE IMPACT OF COTTON ON FRESH WATER RESOURCES AND ECOSYSTEMS: A PRELIMINARY SYNTHESIS 16–17 (1999) (explaining how fertilizer run-off can alter the nutrition system, cause algae growth, kill fish, and affect species composition in a waterway).

chemicals used in the fiber production, dyeing, and bleaching process cause diseases among cotton farmers, pollute ocean waters, and degrade soil.[25] Fourth, textile manufacturers release large amounts of greenhouse gases into the atmosphere while producing, manufacturing, and transporting clothes.[26] Synthetic fibers, in particular, are made directly from fossil fuels.[27] This fossil fuel use increases demand for substances like oil and natural gas that have an environmentally damaging procurement process.[28]

There are also many harmful environmental impacts from clothes after production is complete. For one, microfibers from synthetic garments (like plastic-based polyester and nylon) pollute water every time we wash our clothes.[29] Small aquatic organisms ingest these microfibers, which introduces plastics to the food chain.[30] Additionally, the rapid consumption and destruction of garments results in immense textile waste, with discarded clothing often going to landfills.[31] In 2018 alone, Americans threw away approximately 11.3 million tons of textiles—equivalent to about eighty-one pounds per person.[32]

These devastating environmental impacts continue to increase and are further amplified by the rise of fast fashion. Fast fashion products are based on trendy styles

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25 Kant, *supra* note 23, at 23.

26 Niinimäki et al., *supra* note 20, at 189 (noting that the fashion industry is responsible for about 8–10% of global carbon dioxide emissions).

27 Christina Palacios-Mateo et al., *Analysis of the Polyester Clothing Value Chain to Identify Key Intervention Points for Sustainability*, 33 ENV'T SCI. EUR. 1, 2 (2021).

28 *See 7 Ways Oil and Gas Drilling is Bad for the Environment*, THE WILDERNESS SOC'Y (Jul. 9, 2021), https://www.wilderness.org/articles/blog/7-ways-oil-and-gas-drilling-bad-environment.

29 Palacios-Mateo et al., *supra* note 27, at 11.

30 *Id.*

31 *Id.* at 14.

32 Martina Igini, *10 Concerning Fast Fashion Waste Statistics,* EARTH.ORG (Aug. 2, 2022), https://earth.org/statistics-about-fast-fashion-waste/; *Facts and Figures about Materials, Waste and Recycling: Textiles: Material-Specific Data*, ENV'T PROT. AGENCY, https://www.epa.gov/facts-and-figures-about-materials-waste-and-recycling/textiles-material-specific-data (last updated Nov. 22, 2023).

presented at runway shows, not designed to last.[33] Consumers buy the clothes, wear them a few times, then discard them so that they can hop on the next big trend. These clothes generally cannot be recycled because they are predominantly made from synthetic materials, and thus are thrown in landfills.[34] Despite these facts, some fashion retailers refuse to take responsibility for their environmental damage and continue to profit by using sustainability-themed buzzwords to appeal to environmentally conscious shoppers. It is this dishonest behavior that greenwashing litigation is designed to remediate.

B. EXAMPLES OF GREENWASHING LAWSUITS

Greenwashing lawsuits can be brought by a variety of interested parties, including the FTC, consumers, states, and company shareholders. Lawsuits against fashion retailers have thus far only been brought by the FTC and consumers, but states and shareholders have brought greenwashing suits against companies outside of the fashion industry. This section provides case examples from each of the four different interested parties to illustrate the varying degrees of success achieved by the lawsuits.

1. FTC SUITS

The FTC is a federal agency that protects the public "from deceptive or unfair business practices and from unfair methods of competition through law enforcement, advocacy, research, and education."[35] Congress delegated power to the FTC via the FTC Act of 1914.[36] Section Five of the FTC Act provides the FTC with "Penalty Offense Authority," which enables the agency to seek civil penalties against companies that (1)

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33 Hayes, *supra* note 1.

34 *Id.*

35 *About the FTC,* FED. TRADE COMM'N, https://www.ftc.gov/about-ftc (last visited Mar. 4, 2024).

36 *Federal Trade Commission Act,* FED. TRADE COMM'N, https://www.ftc.gov/legal-library/browse/statutes/federal-trade-commission-act (last visited Mar. 4, 2024).

have engaged in acts or practices "with actual knowledge that such act or practice is unfair or deceptive" in violation of the Act and (2) have already received "a final cease and desist order" from the FTC regarding that act or practice.[37]

Section Five of the FTC Act does not define the term "deceptive."[38] However, in its 1983 Policy Statement on Deception, the FTC explained that deception exists "if there is a representation, omission or practice that is likely to mislead the consumer acting reasonably in the circumstances, to the consumer's detriment."[39] The FTC has also published the "Green Guides" to help marketers understand how to qualify their environmental claims to avoid deceiving consumers.[40] The Green Guides state that "it is deceptive to misrepresent, directly or by implication, that a product, package, or service offers a general environmental benefit" because those claims "are difficult to interpret and likely convey a wide range of meanings."[41] In accordance with this principal, the Green Guides explain that the brand name "eco-friendly" is deceptive because it is highly unlikely that the marketer can substantiate that claim.[42] Although they are non-binding, the Green Guides have become highly persuasive authorities in greenwashing lawsuits.

The FTC has recently used its Penalty Offense Authority to bring greenwashing

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37 15 U.S.C. § 45(m)(1)(B); *see also* Press Release, Fed. Trade Comm'n, FTC Uses Penalty Offense Authority to Seek Largest-Ever Civil Penalty for Bogus Bamboo Marketing from Kohl's and Walmart (Apr. 8, 2022), https://www.ftc.gov/news-events/news/press-releases/2022/04/ftc-uses-penalty-offense-authority-seek-largest-ever-civil-penalty-bogus-bamboo-marketing-kohls.

38 *See* 15 U.S.C. § 45.

39 Fed. Trade Comm'n, Policy Statement on Deception (Oct. 14, 1983), https://www.ftc.gov/system/files/documents/public_statements/410531/831014deceptionstmt.pdf.

40 *Environmentally Friendly Products: FTC's Green Guides,* FED. TRADE COMM'N, https://www.ftc.gov/news-events/topics/truth-advertising/green-guides (last visited Mar. 4, 2024).

41 Guides for the Use of Environmental Marketing Claims, 77 Fed. Reg. 62,122, 62,125–26 (Oct. 11, 2012) (to be codified at 16 C.F.R. pt. 260), https://www.ftc.gov/sites/default/files/documents/federal_register_notices/guides-use-environmental-marketing-claims-green-guides/greenguidesfrn.pdf.

42 *Id.* at 62,126.

lawsuits against fashion and textile retailers who misrepresent that items are made from bamboo, when they are actually made from chemically processed rayon.[43] Rayon, while originally derived from bamboo, is harmful to the environment because the manufacturing process uses toxic chemicals and results in hazardous emissions.[44] Some penalized retailers include Nordstrom, J.C. Penney, Kohl's, and Walmart.[45] For example, in *United States v. Walmart, Inc.*, the FTC sued Walmart for marketing a rayon nursing sleep bra as made from "breathable bamboo fabric" and calling it "eco-friendly" and "all-natural."[46] Similarly, in *United States v. Kohl's, Inc.*, the FTC sued Kohl's for marketing many of its rayon products as part of its "cleaner solutions" initiative.[47] Additionally, in *United States v. Nordstrom, Inc.*, the FTC sued Nordstrom for marketing one of its rayon dresses as made from "100% bamboo."[48]

In each of these cases, the FTC began by issuing a business alert to remind marketers to label and advertise textile products accurately, clarifying that "bamboo" is not the proper name for manufactured rayon, and sending warning letters to the retailers to put

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43 FTC Uses Penalty Offense Authority to Seek Largest-Ever Civil Penalty for Bogus Bamboo Marketing from Kohl's and Walmart, *supra* note 37; Press Release, Fed. Trade Comm'n, Nordstrom, Bed Bath & Beyond, Backcountry.com, and J.C. Penney to Pay Penalties Totaling $1.3 Million for Falsely Labeling Rayon Textiles as Made of "Bamboo" (Dec. 9, 2015), https://www.ftc.gov/news-events/news/press-releases/2015/12/nordstrom-bed-bath-beyond-backcountrycom-jc-penney-pay-penalties-totaling-13-million-falsely.

44 FTC Uses Penalty Offense Authority to Seek Largest-Ever Civil Penalty for Bogus Bamboo Marketing from Kohl's and Walmart, *supra* note 37.

45 *Id.*; Nordstrom, Bed Bath & Beyond, Backcountry.com, and J.C. Penney to Pay Penalties Totaling $1.3 Million for Falsely Labeling Rayon Textiles as Made of "Bamboo," *supra* note 43.

46 Complaint for Civil Penalties, Permanent Injunction, & Other Relief at 9, United States v. Walmart, Inc., No. 22-965 (D.D.C. 2022), https://www.ftc.gov/system/files/ftc_gov/pdf/2023173WalmartComplaint.pdf.

47 Complaint for Civil Penalties, Permanent Injunction, & Other Relief at 9–17, United States v. Kohl's, Inc., No. 22-964 (D.D.C. 2022), https://www.ftc.gov/system/files/ftc_gov/pdf/2023171KohlsComplaint.pdf.

48 Complaint for Civil Penalties, Injunctive, & Other Relief at 5, United States v. Nordstrom, Inc., No. 1:15-cv-2130 (D.D.C. 2015), https://www.ftc.gov/system/files/documents/cases/151209nordstromcmpt.pdf.

them on notice of their lack of compliance.[49] But when years passed and the retailers failed to comply, the FTC brought actions against them and secured major penalties. Kohl's agreed to pay $2.5 million, and Walmart agreed to pay $3 million in civil penalties.[50] The retailers were also barred from making misleading or unsubstantiated claims that products provided environmental benefits simply because they were derived from bamboo.[51] Thus, the lawsuits solidified the FTC's role as a major player in the greenwashing arena and highlighted the FTC's ability to drive real change in the fashion industry through its Penalty Offense Authority.

2. CONSUMER SUITS

In addition to the FTC, consumers can also sue fashion retailers for greenwashing, but consumers have historically achieved minimal success through their lawsuits. Consumer suits often raise issues regarding problematic indexes that retailers use to certify their clothing as sustainable, but courts have declined to fault retailers simply for using these indexes. While consumers do not all raise the same claims, consumer suits generally include state and federal claims of unfair and deceptive trade practices, fraud, and false advertising.[52]

For example, in *Dwyer v. Allbirds, Inc.*, a consumer filed a class-action lawsuit

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49 Press Release, Fed. Trade Comm'n, FTC Warns 78 Retailers, Including Wal-Mart, Target, and Kmart, to Stop Labeling and Advertising Rayon Textile Products as "Bamboo" (Feb. 3, 2010), https://www.ftc.gov/news-events/news/press-releases/2010/02/ftc-warns-78-retailers-including-wal-mart-target-kmart-stop-labeling-advertising-rayon-textile.

50 Press Release, U.S. Dep't of Just., Kohl's and Walmart Agree to Pay $5.5 Million in Combined Penalties for Alleged Deceptive Violations of the Textile Act and Rules and FTC Act Around the Use of Bamboo (May 5, 2022), https://www.justice.gov/opa/pr/kohl-s-and-walmart-agree-pay-55-million-combined-penalties-alleged-deceptive-violations.

51 *Id.*

52 Nathan A. Huff, *Litigation Minute: Greenwashing Case Highlights Threat of ESG Litigation to Agribusinesses*, K&L GATES (July 5, 2022), https://www.klgates.com/Litigation-Minute-Greenwashing-Case-Highlights-Threat-of-ESG-Litigation-to-Agribusinesses-7-5-2022.

against Allbirds, a wool shoe retailer, for deceptive business practices, false advertising, breach of express warranty, fraud, and unjust enrichment.[53] The consumer's concerns arose out of Allbirds' advertising representations, which included statements like "low carbon footprint," "environmentally friendly," and "made with sustainable wool."[54] The consumer made two allegations: (1) that Allbirds relied on problematic tools and indexes to calculate the environmental impact of its products, and (2) that Allbirds claimed that its sheep "live the good life," even though general wool harvesting practices are cruel to sheep and the company's wool supplier only audited its sheep farms every three years.[55] The consumer alleged that the problematic index understated the products' carbon footprint because Allbirds did not account for the entire life cycle of wool production nor measure other forms of environmental damages from wool production like water consumption and eutrophication.[56]

The court dismissed the consumer's claims and suggested that, while the sustainability indexes and tools Allbirds used may have been problematic, Allbirds did not make any factually inaccurate calculations and thus could not have mislead the reasonable consumer.[57] The court explained,

> [Allbirds] does not mislead the reasonable consumer because it makes clear what is included in the carbon footprint calculation, and does not suggest that any factors are included that really are not. . . . There may well be room for improvement in the [sustainability index], but that does not suggest that reliance on the current standard is deceptive. [58]

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53 Dwyer v. Allbirds, Inc., 598 F. Supp. 3d 137, 147 (S.D.N.Y. 2022).
54 *Id.* at 144.
55 *Id.* at 145–46.
56 *Id.* at 145.
57 *Id.* at 150.
58 *Id.* at 150–51.

The court also found that the consumer had failed to plausibly suggest that Allbirds sourced its wool from a sheep farm that actually used inhumane harvesting practices, and the complaint seemed to be more directed at the wool industry as a whole.[59] Thus, even though the consumer raised important points about the misleading elements of Allbirds' advertisements, the court dismissed the lawsuit.[60]

The *Allbirds* court based its decision in part on a similar case where a consumer sued clothing retailer Canada Goose, claiming that the company had made misrepresentations regarding coyote fur sourcing for certain Canada Goose jackets.[61] In that case, *Lee v. Canada Goose U.S., Inc.*, the consumer alleged violations of the District of Columbia Consumer Protection Procedures Act, state consumer protection statutes, breach of express warranty, and unjust enrichment.[62] The consumer argued that while Canada Goose committed itself "to support the ethical, responsible, and sustainable sourcing and use of real fur," it still allowed for sourcing from animal trappers who used painful snares and leg traps, both of which can cause death by strangulation or fatal leg injuries.[63] The consumer further alleged that Canada Goose proclaimed to comply with the Agreement of International Humane Trapping Standards and the Best Managed Practices in a misleading way, because the standards themselves authorized inhumane trapping practices.[64] But the court found no fault with Canada Goose using problematic standards.[65]

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59 *Id.* at 152.
60 *See id.* at 154.
61 *See id.* at 151–53; Lee v. Canada Goose U.S., Inc., No. 20 Civ. 9809 (VM), 2021 WL 2665955, at *1 (S.D.N.Y. June 29, 2021).
62 *Canada Goose*, 2021 WL 2665955, at *1–3.
63 *Id.* at *2.
64 *Id.* at *3.
65 *Id.* at *6–7.

The court wrote, "that the relevant standards may nonetheless be inhumane or inadequate does not represent [Canada Goose's] representations as to compliance false or misleading."[66] However, the court did allow the consumer's other allegation to proceed, writing that "the allegations support the reasonable inference that Canada Goose's purported commitment to 'ethical' fur sourcing is misleading because Canada Goose obtains fur from trappers who use allegedly inhumane leghold traps and snares."[67] But a few months after this decision, the consumer and Canada Goose jointly filed a stipulation stating that the consumer was dismissing the action with no reason provided as to why.[68] Canada Goose made no payment to settle the case.[69]

Despite these losses, consumers have continued to file complaints against fashion retailers purporting to be sustainable. For instance, in 2022, a consumer filed a complaint against H&M, a fast fashion giant known for its cheaply made and discardable clothing, alleging that H&M falsely marketed some of its clothes as a part of a "Conscious Collection" using the Higg Material Sustainability Index (Higg MSI).[70] This index was one that the *Allbirds* plaintiff had also taken issue with.[71] According to the complaint, H&M used Higg Scorecards to explain the environmental impacts of some of their products, but a flaw on H&M's website distorted the data.[72] For example, a dress that received a water-

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66 *Id.* at *6.

67 *Id.* at *7.

68 Chelsea Dobrosielski, *Canada Goose and Allbirds' Animal-Welfare Lawsuits Are Over,* SOURCING J. (Apr. 29, 2022), https://sourcingjournal.com/topics/business-news/canada-goose-fur-lawsuit-allbirds-greenwashing-sustainable-certifications-zq-merino-342106/.

69 *Id.*

70 Class Action Complaint at 1, 3–4, Commodore v. H&M Hennes & Mauritz LP, No. 7:22-cv-06247 (S.D.N.Y. July 22, 2022), https://www.classaction.org/media/commodore-v-h-and-m-hennes-and-mauritz-lp.pdf [hereinafter H&M Complaint].

71 *See Allbirds*, 598 F. Supp. 3d at 145.

72 H&M Complaint, *supra* note 70, at 3.

use score of negative twenty percent (meaning that it used 20% *more* water than average) was listed on H&M's website as using twenty percent *less* water.[73]

Additionally, the consumer alleged that H&M was running "a larger greenwashing campaign filled with additional Sustainability Misrepresentations."[74] For example, the consumer stated that H&M's Conscious Collection touted some products as containing "at least fifty percent sustainable materials, such as organic cotton and recycled polyester," even though polyester is an "indisputably unsustainable material" because it does not biodegrade, it is not recyclable, and it sheds toxic microfibers.[75] The consumer alleged that some of the products in the Conscious Collection contained an even higher percentage of synthetic materials than the main collection, but H&M suggested to consumers that the materials were nonetheless environmentally sustainable.[76] The consumer also noted that H&M advertised "a recyclability program with bins in stores to convince consumers that they can purchase products without adding to the significant waste of the fast-fashion industry," but that only thirty-five percent of what H&M collected was ultimately recycled.[77] Unfortunately, interested observers do not know how the court would have ruled in this matter because the court voluntarily dismissed the case with prejudice on December 13, 2023.[78] Before the dismissal was announced, however, the case garnered

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73 *Id.*; *see also* Amanda Shendruk, *Quartz Investigation: H&M Showed Bogus Environmental Scores For Its Clothing,* QUARTZ (June 29, 2022), https://qz.com/2180075/hm-showed-bogus-environmental-higg-index-scores-for-its-clothing (explaining further that H&M removed the environmental scorecards from its website after the investigators told the company about its findings).

74 H&M Complaint, *supra* note 70, at 5.

75 *Id.*

76 *Id.*

77 *Id.* at 7; Mia Otte, *H&M's Green Initiative is a Scam,* MEDIUM (Jan. 1, 2019), https://medium.com/@ameliaotte/h-ms-green-initiative-is-a-scam-73bc23fe94.

78 Notice of Voluntary Dismissal Pursuant to Fed. R. Civ. P. 41(a)(1)(A)(i) with Prejudice at 2, Commodore v. H&M Hennes & Mauritz LP, No. 7:22-cv-06247 (S.D.N.Y. Dec. 13, 2013).

widespread publicity.[79] Thus, consumers have not had much legal success in suing companies for greenwashing, but their lawsuits have been instrumental in bringing attention to dubious practices by fashion giants.

3. STATE SUITS

States can also bring lawsuits against companies for greenwashing.[80] These lawsuits allege that the defendant has violated federal or state laws or business codes by selling its products in or into state boundaries.[81] State attorney generals can bring these suits because they are "constitutionally designated as the chief law officer of the [s]tate and ha[ve] the constitutional authority to ensure that state law is adequately enforced."[82] The lawsuits can also be brought by county district attorneys on behalf of the state.[83]

One example of a state greenwashing lawsuit against a company is found outside of the fashion industry.[84] In this case, *People of the State of California v. Endo Plastics, LLC,* then-Attorney General Kamala Harris brought a lawsuit against three companies that

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79 *See, e.g.*, Alden Wicker, *H&M Is Being Sued for Greenwashing. What Does That Mean For Fashion?*, THE CUT (Aug. 19, 2022), https://www.thecut.com/2022/08/h-and-m-greenwashing-fashion.html; Jasmin M. Chua, *H&M Lawsuit Over 'Misleading' Green Claims Exposes Fashion's 'Unique Obsession,'* SOURCING J. (July 29, 2022), https://sourcingjournal.com/sustainability/sustainability-news/hm-lawsuit-greenwashing-higg-msi-misleading-sustainability-chelsea-commodore-357828/; Matthew Stern, *H&M Case Shows How Greenwashing Breaks Brand Promise*, FORBES (July 13, 2022), https://www.forbes.com/sites/retailwire/2022/07/13/hm-case-shows-how-greenwashing-breaks-brand-promise/?sh=266c81dc1171.

80 *See* Press Release, Cal. Dep't of Just. Off. of the Att'y Gen., Attorney General Kamala D. Harris Sues Plastic Water Bottle Companies Over Misleading Claims of Biodegradability (Oct. 26, 2011), https://oag.ca.gov/news/press-releases/attorney-general-kamala-d-harris-sues-plastic-water-bottle-companies-over.

81 *See, e.g.,* Complaint for Injunction, Civil Penalties, and Other Relief at 4–7, People v. Enso Plastics, LLC (Cal. App. Dep't Super. Ct. Oct. 26, 2011) (No. 30-2011-00518091), 2011 WL 5103052, https://oag.ca.gov/system/files/attachments/press_releases/n2577_complaint.pdf [hereinafter Enso Complaint].

82 *See id.* at 2.

83 *See, e.g.,* Press Release, Cnty. of Monterey, Cal., District Attorney Announces Settlement with Amazon.com, Inc. For Sales of "Biodegradable" Plastic Items (Aug. 1, 2018), https://www.co.monterey.ca.us/home/showdocument?id=67593.

84 *See People of the State of California v. Endo Plastics, LLC,* COLUM. L. SCH. (Apr. 8, 2013), https://climate.law.columbia.edu/content/people-state-california-v-endo-plastics-llc.

labeled or marketed plastic water containers as "biodegradable" and "recyclable."[85] Enso Plastics sold plastic beverage containers; Balance Water Company and Aquamantra both sold bottled water products using Enso's containers.[86] The State argued that the companies wrongfully claimed the plastic containers were completely biodegradable—meaning they left only natural remains—and that the biodegradation process was complete within one to five years in a landfill, compost, or other environment (like by the side of the road).[87] The State wrote that the claims were "false, deceptive, and misleading to consumers because the plastic bottles will not biodegrade as claimed, either in a landfill or any other environment."[88] The complaint noted that state law restricted the use of the claim "biodegradable" on the labeling of plastic beverage containers since the legislature determined that the term is inherently misleading to consumers on disposable plastics.[89]

The State also took issue with claims that the bottles were recyclable because the bottles were, in fact, made with degradable additives that are considered contaminants by plastic recyclers.[90] Items made with these degradable additives were "culled out from recyclable plastics" where possible, so the claim of recyclability was deceptive and misleading to consumers.[91]

Nearly two years after the filing of the complaint, the three companies were unable to verify their environmental claims and entered into individual settlements with the

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85 Enso Complaint, *supra* note 81, at 1.
86 *Id.* at 2–3.
87 *Id.* at 3.
88 *Id.*
89 *Id.*
90 *Id.*
91 *Id.*

State.[92] The agreement required the companies to remove all of their biodegradability and recyclability claims from their additive-based products, pay hefty penalties and fees, and notify their customers in accordance with the settlement terms.[93] The settlement ordered Enso Plastics, for example, to pay $18,000 in civil penalties and provide unlimited notice of the state's requirements on biodegradable claims on its website, marketing materials, displays, invoices, and any other promotional materials.[94] The company was even ordered to provide notice and receive acknowledgment of the notice from its future customers.[95]

After the *Enso* case settled, California continued to aggressively enforce against misleading environmental claims.[96] In 2017, the state obtained a penalty of $27,000 from Overstock.com and $940,000 from Walmart.[97] In 2018, twenty-three California district attorneys obtained a settlement of $1.5 million with Amazon for its mislabeling of certain products as "biodegradable" and "compostable."[98] Thus, states, like the FTC, have been able to directly reduce instances of greenwashing, but their attention thus far has been largely focused outside of the fashion industry.

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92 *See* Notice of Entry of Judgment as to Enso Plastics, LLC at 5–6, People v. Enso Plastics, LLC No. 30-2011 00518091, (Cal. App. Dep't Super. Ct. Apr. 18, 2013), https://climate.law.columbia.edu/sites/default/files/content/Enso-Plastic-Settlement.pdf [hereinafter Enso Notice of Judgment]; Lanh Nguyen, *Apr 23 – CA AG Settles False Biodegradable Claim Lawsuit,* CALIFORNIANS AGAINST WASTE (Nov. 7, 2013), https://www.cawrecycles.org/recycling-news/1950.

93 Nguyen, *supra* note 92.

94 Enso Notice of Judgment, *supra* note 92, at 9–11. The California Notice read:
California law prohibits the sale of plastic packaging and plastic products that are labeled with the terms 'biodegradable,' 'degradable,' or 'decomposable,' or any form of those terms, or that imply in any way that the item will break down, biodegrade or decompose in a landfill or other environment. These restrictions apply to all sales in or into the State of California, including such sales over the Internet.
Id. at 9.

95 *Id.* at 9–10.

96 Sheila A. Millar & Jean-Cyril Walker, *23 California DAs Obtain $1.5 Million Settlement for Deceptive Biodegradable Claims,* THE NAT'L L. REV. (Aug. 9, 2018), https://www.natlawreview.com/article/23-california-das-obtain-15-million-settlement-deceptive-biodegradable-claims.

97 *Id.*

98 *Id.*

4. SHAREHOLDER SUITS

Shareholders can also bring lawsuits against companies for greenwashing, but the number of case examples involving shareholder-plaintiffs is still quite low. Shareholder lawsuits are often based on federal securities law.[99] A securities class action is a lawsuit that is brought on behalf of a group of investors who have suffered a financial loss due to the company's violations of securities laws.[100] Many cases involve the company making materially false statements to investors in prospectuses, earnings announcements, or SEC filings.[101]

A good example of a shareholder lawsuit is again found outside of the fashion industry. In 2021, investors filed a complaint against Danimer Scientific, a bioplastics company that manufactured a plastic substitute, Nodax, that the company claimed was 100% biodegradable.[102] The company's chief executive described Nodax as "the holy grail of plastic," claiming that unlike traditional plastics, Nodax would be consumed by microorganisms when thrown away.[103]

However, Danimer's stock price plummeted after an article published in The Wall Street Journal alleged that Danimer had greatly exaggerated its product's ability to

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99 *See, e.g.*, Class Action Complaint at 2, In re Danimer Sci., Inc. Sec. Litig.. No. 1:21-CV-02708, 2023 WL 6385642 (E.D.N.Y. Sept. 30, 2023) (E.D.N.Y. 2021) (1:21CV02708), https://www.dandodiary.com/wp-content/uploads/sites/893/2021/05/Danimer-Scientific-complaint.pdf [hereinafter Danimer Complaint].

100 *What is a Securities or Shareholder Class Action?,* PEARSON WARSHAW, https://pwfirm.com/securities-class-actions-and-the-pslra/ (last visited Feb. 16, 2023).

101 *Id.*

102 Danimer Complaint, *supra* note 99, at 3–4; Roger E. Barton, *The Greenwashing Wave Hits Securities Litigation,* REUTERS (Sept. 22, 2022), https://www.reuters.com/legal/legalindustry/greenwashing-wave-hits-securities-litigation-2022-09-22/.

103 Saabira Chaudhuri, *Plastic Straws That Quickly Biodegrade in the Ocean? Not Quite, Scientists Say,* THE WALL ST. J. (Mar. 20, 2021), https://www.wsj.com/articles/plastic-straws-that-quickly-biodegrade-in-the-ocean-not-quite-scientists-say-11616238001.

completely biodegrade in oceans and landfills.[104] The article noted that "at some ocean temperatures, Nodax straws could take between five and [ten] years to biodegrade," and that Danimer's most "conservative" testing seemed to show far quicker biodegradation.[105] Additionally, the article stated that while Danimer had advertised Nodax's ability to biodegrade in landfills, even experts could not predict how long the process would take.[106] One expert in the article directly accused Danimer of greenwashing.[107]

After the article's release, investors alleged that Danimer had made "materially false and misleading statements regarding the [c]ompany's business, operations, and compliance policies," and that it had "overstated [the product's] biodegradability, particularly in oceans and landfills."[108] The complaint also noted that the company's prior and current management had "a troubled history of dubious business practices," and that Danimer's CEO had previously knowingly manufactured and sold defective bullet-proof vests and attempted to cover up the fraud by threatening a supplier.[109] The investors described their damages from the Nodax advertising as "the precipitous decline in the market value of [Danimer's] securities."[110]

In Danimer's motion to dismiss, filed about one year after the initial complaint, the company argued that its claims of biodegradability applied only to the Nodax material and not to any end products, like plastic straws or bottles.[111] The company further argued that

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104 Barton, *supra* note 102.
105 Chaudhuri, *supra* note 103.
106 *Id.*
107 *Id.*
108 Danimer Complaint, *supra* note 99, at 3.
109 *Id.*
110 *Id.* at 5.
111 Barton, *supra* note 102.

the investors had not alleged anything that contradicted the certifications or scientific research supporting the company's claims.[112] On September 30, 2023, the court granted Danimer's motion to dismiss, finding that investors failed to adequately allege that Danimer had knowingly or recklessly made misleading statements about their products' biodegradability.[113]

Thus, four groups of interested parties—the FTC, consumers, states, and shareholders—drive much of the action in greenwashing litigation. Companies harm numerous individuals when they falsely advertise products as sustainable, and as more companies recognize the risks of potential litigation, they may start to more carefully and truthfully attempt to appeal to the environmentally conscious consumer.

III. CHANGES IN THE FASHION INDUSTRY SPURRED BY GREENWASHING SUITS

This section examines three structural changes in the fashion industry that have been spurred by greenwashing litigation. These changes include (1) greater scrutiny of fashion sustainability indexes, (2) greater legislative action to regulate the fashion industry, and (3) increased consumer awareness of the environmental impacts of fast fashion. This section also explores what more can be done by fashion retailers, legislators, and consumers to work towards a more sustainable future.

A. GREATER SCRUTINY OF SUSTAINABILITY INDEXES

One of the biggest impacts of fashion greenwashing litigation has been increased scrutiny of the problematic sustainability indexes that fashion retailers use to certify their clothing. The problems with these indexes have remained prevalent because courts have

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[112] *Id.*

[113] Memorandum & Order at 21–30, In re Danimer, 2023 WL 6385642, at *10–15, https://storage.courtlistener.com/recap/gov.uscourts.nyed.464200/gov.uscourts.nyed.464200.66.0.pdf.

refused to modify or fix the indexes themselves. As noted above, in the *Allbirds* and *Canada Goose* cases, the presiding judges wrote that while the indexes may have been problematic or inadequate themselves, it was not the job of the court to second-guess the indexes' methodology.[114]

Nevertheless, the publicity surrounding these cases has brought widespread attention to the indexes. Thus, despite a lack of court orders to modify the indexes, there has been a push in the fashion industry for better and more reliable indexes. One sustainability index that has recently come under fire is the Higg MSI. This index was a subject of controversy in both the *Allbirds* case and the *H&M* case. In *Allbirds,* the plaintiff alleged that the Higg MSI addressed only raw materials and lacked standards for comparing different materials, and that independent researchers found the Higg MSI to be "unsuitable 'for public disclosure or comparative assertions.'"[115] In *H&M,* the plaintiff alleged that H&M's website distorted the data in environmental scorecards derived from the Higg MSI.[116]

A few weeks after the *Allbirds* decision, a New York Times article highlighted the problems with the Higg MSI and called for more accountability in the fashion industry.[117] The article emphasized that the index strongly favored synthetic materials made from fossil fuels over natural materials like cotton, wool, or leather.[118] Representatives from the natural fiber industries further argued that the index was "used to portray the increasing

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[114] *See Allbirds*, 598 F. Supp. 3d at 150–51; *Canada Goose*, 2021 WL 2665955, at *6.
[115] *Allbirds*, 598 F. Supp. 3d at 145.
[116] H&M Complaint, *supra* note 71, at 4–5.
[117] Hiroko Tabuchi, *How Fashion Giants Recast Plastic as Good for the Planet,* N.Y. TIMES (June 12, 2022), https://www.nytimes.com/2022/06/12/climate/vegan-leather-synthetics-fashion-industry.html.
[118] *Id.*

use of synthetics use [sic] as environmentally desirable despite questions over synthetics' environmental toll."[119]

The article pointed out that a group called the Sustainable Apparel Coalition (SAC) formulated the Higg MSI.[120] The SAC consisted of members of the retail industry with a personal stake in the outcome—including H&M, Nike, Amazon, and Target.[121] Many of these brands profited from the branding of synthetic materials as "sustainable" because they produced trendy garments made from synthetic materials.[122] A major flaw of the index, the article noted, was that the SAC had used questionable methods used to rate the sustainability of various fabrics.[123] For example, polyester—a plastic-based synthetic material—was erroneously rated as one of the world's most sustainable fabrics.[124] This determination had been based on data from European polyester manufacturers, even though most of the world's polyester came from Asia—where manufacturers used a dirtier energy grid and were subject to less stringent environmental rules.[125]

The New York Times article was further disseminated through other news outlets. Apparel Insider and Vogue Business both published both published follow-up articles.[126] The Higg Index published a response to the article on its website, writing that "the article missed the real story in apparel, which is that there are urgent data gaps that need to be

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119 *Id.*
120 *Id.*
121 *Id.*
122 *Id.*
123 *Id.*
124 *Id.*
125 *Id.*
126 Brett Mathews, *Higg Index Slammed by New York Times Article*, APPAREL INSIDER (June 14, 2022), https://apparelinsider.com/higg-index-slammed-by-new-york-times-article/; Rachel Cernansky, *Higg Index Controversy Exposes Deep Cracks in Fashion's Sustainability Efforts*, VOGUE BUS. (July 7, 2022), https://www.voguebusiness.com/sustainability/higg-index-controversy-exposes-deep-cracks-in-fashions-sustainability-efforts.

filled by material and fiber producers."[127] Despite its best efforts, the index could not overcome the bad press.[128] Four days after the New York Times article was published, the Norway Consumer Authority issued a statement banning brands from using the Higg MSI to make environmental marketing claims.[129] In response, the SAC paused the use of the consumer-facing portion of the Higg MSI and commissioned an independent third-party review of the Higg data and methodology.[130]

The controversy surrounding the Higg MSI has highlighted a need for an independent, reliable, and accurate index that fashion retailers can use to certify their clothing. One such index may already exist, but it only publicly reports on the industry's thirty biggest companies and only its key findings are freely accessible (the in-depth analysis must be purchased online).[131] This index, called the Business of Fashion Sustainability Index (BoF Index) considers six environmental impact categories: emissions, transparency, water and chemicals, materials, workers' rights, and waste.[132] It uses around 200 different metrics to assess companies' progress towards targets in each of

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127 Press Release, Worldly, Response to New York Times Article on 'Vegan Leather' and Materials. Since the original publication of this Press Release, Higg has relaunched as Worldly. *Id.* ("Note: This article predates our launch as Worldly.").

128 *See* David Evans, *The Higg Index: True Sustainability or a Way for the Fashion Industry to Keep Polluting?*, ECO-STYLIST (Nov. 7, 2022), https://www.eco-stylist.com/the-higg-index-true-sustainability-or-a-way-for-the-fashion-industry-to-keep-polluting/; Amanda Shendruk, *The Controversial Way Fashion Brands Gauge Sustainability is Being Suspended*, QUARTZ (June 29, 2022), https://qz.com/2180322/the-controversial-higg-sustainability-index-is-being-suspended; Amina Razvi, *Statement from the SAC Regarding the Norwegian Consumer Authority and Environmental Claims*, SUSTAINABLE APPAREL COAL. (June 27, 2022), https://apparelcoalition.org/blog/statement-from-the-sac-regarding-the-norwegian-consumer-authority-and-environmental-claims/.

129 Evans, *supra* note 128.

130 Shendruk, *supra* note 128; Razvi, *supra* note 128.

131 *The BoF Sustainability Index 2022,* BUS. OF FASHION INSIGHTS, https://shop.businessoffashion.com/products/the-bof-sustainability-index-2022 (last visited Feb. 16, 2024).

132 *Id.*

the six categories.[133] For example, a target in the emissions category is to reduce absolute greenhouse gas emissions by forty-five percent by 2030, and a target in the water and chemicals category is to reduce water use to naturally replenishable levels by 2030.[134] BoF explains that it set targets after "consultation with an external council of sustainability experts . . . and [the targets] are intended as a framework to establish more environmentally and socially responsible business practices by the end of the decade."[135]

In 2022, the BoF Index revealed that the fashion industry's largest companies had not yet created sufficient momentum to transform the industry by 2030.[136] For example, fashion brand Puma topped the list of most sustainable brands but only received a score of forty-nine out of one hundred points—twenty-one points higher than the meager index average of twenty-eight points.[137] The Puma CEO later commented, "[w]e welcome the recognition in the BoF Sustainability Index 2022 and will take our leadership position as an encouragement to take the next step on our sustainability journey. We agree with the conclusions that much remains to be done to bring our industry in line with the goal of the Paris Agreement on Climate Change as well as the United Nations Sustainable Development Goals."[138]

It would be very helpful for consumers to easily view these scores from fashion retailers' websites as they purchase products online. Instead of relying on faulty or

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133 *Id.*
134 *Id.*
135 *Id.*
136 *Id.*
137 Rachel Douglass, *Puma and Kering Rank Top of BoF's Sustainability Index 2022*, FASHION UNITED (June 2, 2022), https://fashionunited.uk/news/business/puma-and-kering-rank-top-of-bof-s-sustainability-index-2022/2022060263416.
138 *Id.*

misleading indexes like the Higg MSI, fashion retailers could publish their scores from an independent and reliable index like BoF and show consumers how much progress they are really making towards a more sustainable future. Thus, while greenwashing lawsuits have increased scrutiny into misleading sustainability indexes, they have also revealed a need for an independent index that fashion retailers can use to certify their clothing.

B. GREATER LEGISLATIVE ACTION

Another change spurred by greenwashing litigation is greater legislative action to regulate the fashion industry. Lawsuits against fashion retailers have brought attention to the fact that the fashion industry is severely underregulated.[139] The lack of regulation is largely due to the globalization of fashion—the industry is highly fragmented with a long supply chain and many production stages happening all over the world.[140] Even when some countries enforce fast fashion barriers through legislation, manufacturers shift production to undeveloped countries.[141] For example, the U.S. passed the Resource Conservation and Recovery Act in 1976 to regulate the management of hazardous wastes in surrounding lakes and streams—but while the U.S. became less polluted, the environment abroad suffered.[142]

Some legislative bodies are starting to take action to increase transparency in the fashion industry. New York, for instance, has been considering the Fashion Sustainability and Social Accountability Act that, if passed, would require certain fashion companies to

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[139] *See* Lauren Smarch, *Fast Fashion: Why Governments Need to Take Action*, EARTHDAY (Feb. 10, 2022), https://www.earthday.org/fast-fashion-why-governments-need-to-take-action/.

[140] Ashley Southard, *Why Regulations Aren't Solving the Fashion Industry's Environmental Problem,* MEDIUM (Nov. 11, 2019), https://medium.com/age-of-awareness/why-regulations-arent-solving-the-fashion-industry-s-environmental-problem-9a50be4c2843.

[141] *Id.*

[142] *See id.*

map at least fifty percent of their supply chain, disclose their social and environmental impacts, and make concrete plans to reduce those numbers.[143] The Act would apply to any global apparel or footwear retailer with over $100 million in revenue doing business in New York—including brands like Prada, Armani, Shein, and Boohoo.[144] It would also require companies to disclose their material production volumes to reveal how much cotton, leather, or polyester they sell.[145]

Critiques of the New York bill revolve around its enforceability and actual impact on reducing environmental harms. For example, while the act would require companies to map out at least fifty percent of their supply chain, it does not specify which fifty percent and instead *encourages* companies to focus on the areas with the most impact—though profit-focused companies would probably show the fifty percent that makes them look best.[146] Additionally, critics advocate for additional language requiring companies to set and meet science-based targets, rather than just focusing on disclosure.[147] In response, a drafter of the bill has stated that "[the bill is] not just about the reporting. It's about the setting and meeting of these targets," and that legislators are looking at amendments to clarify that in the bill.[148] After its introduction in 2021, the bill did not make it out of Committee, but it was reintroduced in 2023, and many speculate that it will gain renewed

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143 Vanessa Friedman, *New York Could Make History With a Fashion Sustainability Act,* N.Y. TIMES (Jan. 7, 2022), https://www.nytimes.com/2022/01/07/style/new-york-fashion-sustainability-act.html.

144 *Id.*

145 *Id.*

146 Rachel Cernansky, *Deconstructing New York's Fashion Act,* VOGUE BUS. (Jan. 13, 2022), https://www.voguebusiness.com/sustainability/deconstructing-new-yorks-fashion-act.

147 *Id.*

148 *Id.*

traction in 2024.[149]

Several countries in Europe also have mandatory due diligence laws that require companies in all industries to identify and report on environmental abuses in their supply chains, and the European Union is currently developing legislation on the same front, as well.[150] In the U.S., the senate introduced a bill to improve working conditions and ensure fair wages in apparel production in the country.[151] The bill, sponsored by prominent senators like Cory Booker, Elizabeth Warren, and Bernie Sanders, was introduced in 2022 and sought to provide greater pay for garment workers in the U.S. and to offer tax incentives to encourage brands to bring their garment manufacturing back to the U.S.[152] However, this bill focused more on workers' rights rather than mitigating environmental damages.[153] It did not make it out of the Senate Committee on Finance.[154] While introducing bills in this space is a start, true accountability will not happen until proposals become law.

C. GREATER CONSUMER AWARENESS

Finally, greenwashing litigation and the overall unmasking of the fashion industry

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149 *Bill S7428A 2021-2022 Legislative Session*, N.Y. STATE SENATE, https://www.nysenate.gov/legislation/bills/2021/S7428/amendment/original#:~:text=Under%20the%20bill%2C%20apparel%20and,targets%20to%20improve%20those%20impacts (last visited Feb. 17, 2024); *Assembly Bill A4333A 2023-2024 Legislative Session*, N.Y. STATE SENATE, https://www.nysenate.gov/legislation/bills/2023/A4333/amendment/A#:~:text=2023%2DA4333%20%2D%20Summary-,Requires%20fashion%20sellers%20to%20be%20accountable%20to%20standardized%20environmental%20and,benefit%20the%20workers%20and%20communities (last visited Feb. 17, 2024); Sarah Kent, *Is This the Year New York Regulates Fashion?*, BUS. OF FASHION INSIGHTS (Jan. 9, 2024), https://www.businessoffashion.com/articles/sustainability/bills-to-regulate-the-fashion-industry-introduced-into-the-state-legislature/.

150 *Id.*

151 Ana Colón, *Everything You Need to Know About the FABRIC Act, the First Federal Fashion Bill,* FASHIONISTA (May 16, 2022), https://fashionista.com/2022/05/fabric-act-federal-fashion-bill-explainer.

152 *Id.*

153 *Id.*

154 *See generally* FABRIC Act, S. 4213, 117th Cong. (2022).

has led to greater consumer awareness of the harmful effects of fast fashion and a rise in the more sustainable practice of buying secondhand clothes.[155] Buying secondhand clothes is one of the most sustainable ways to shop because it helps to curb production pollution and creates a more circular economy.[156]

According to one consumer resale survey, approximately thirty-seven percent of consumers said that many of the claims made about sustainable fashion felt like greenwashing.[157] Accordingly, in 2021, the U.S. resale market grew by fifty-eight percent from the previous year, which was the highest level of growth in five years.[158] Approximately fifty-seven percent of consumers resold their apparel in 2021, and approximately fifty-three percent of consumers purchased secondhand apparel.[159] Most surveyed consumers believed that buying secondhand gave them bragging rights and said they went out of their way to tell people they were wearing secondhand—a stark change from a decade ago when secondhand clothes were considered taboo and unfashionable.[160]

Like consumers, fashion retailers are starting to move their own clothes to the resale market.[161] Brands with their own resale shops increased from eight in 2020 to thirty in 2021.[162] Online clothing resellers are also changing the game by offering consumers a convenient way to browse collections on the internet rather than only displaying inventory

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155 *See* Angelica Pizza, *Secondhand Clothing is Becoming the Fashion Industry's Hottest Trend*, BRIGHTLY (Apr. 4, 2022), https://brightly.eco/blog/secondhand-clothing-trend.

156 *Id.*

157 *2022 Resale Report,* THREDUP, https://www.thredup.com/resale/2022/#size-and-impact (last visited Feb. 16, 2024).

158 *Id.*

159 *Id.*

160 *Id.*; *see also* Pizza, *supra* note 155 (explaining that when a secondhand store opened in Brooklyn "in 2012, customers would leave when they found out the merchandise was preowned.").

161 *2022 Resale Report*, *supra* note 157.

162 *Id.*

in brick-and-mortar stores.[163] Resale shops are even using social media platforms like Instagram to sell directly to consumers. One secondhand shop owner has said, "[w]e used to be mainly in-person buys only. . . . We really ramped up our 'Instagram Story Sales.' We post [fifty to seventy] items a day to our Instagram Stories and customers DM us if they want to purchase them. Some days this makes up the majority of our sales!"[164]

While the secondhand clothing market grows, some fast fashion giants, like Shein, are now starting to see a decline in sales and valuation.[165] Though Shein quadrupled its U.S. sales between 2019 and 2021, it saw a dramatic slowdown in its growth starting in early 2022.[166] In June 2022, the online retailer saw its first year-on-year sales decline since the start of the COVID-19 pandemic.[167] Commentators pointed to a variety of factors that could have led to this decline, such as a slowing economy and less overall spending, but included in this list was a change in attitudes about fast fashion and the rise of environmental awareness.[168] One publication noted that "Shein's negative publicity regarding sustainability in its supply chain may have taken a toll."[169] Another publication noted that "slower sales growth and criticism over Shein's environmental, social and governance record could have an impact on the IPO timeline and valuation" and that these factors had "influenced some investors' thinking about whether to sell at least part of their

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163 Pizza, *supra* note 155.
164 *Id.*
165 Cathaleen Chen, *Shein's Years of Explosive Growth Are Over. What's Next?*, BUS. OF FASHION (Jan. 30, 2023), https://www.businessoffashion.com/articles/retail/shein-peak-slowing-growth/.
166 *Id.*
167 *Id.*
168 *See id.*
169 *Id.*

stakes privately."[170]

However, some consumers continue to fiercely defend fast fashion giants like Shein, writing that they make trendy clothing accessible to everyone at low prices.[171] In fact, despite many shocking allegations against Shein (including potential child and slave labor claims), Shein plans to go public on the U.S. market in 2024.[172]

Because new sustainable fashion (not secondhand) tends to be more expensive than non-sustainable fashion, some consumers argue that critics of fast fashion may be disregarding wealth disparities in shoppers.[173] Shein is maintaining this argument and attempting to reframe itself as a more sustainable brand.[174] For example, Shein has hired a global head of ESG who claims that introducing thousands of new items each day is actually a feature—not a bug—of the company's sustainability model.[175] The executive claims that Shein minimizes waste by only producing goods in small batches then waiting to see how consumers respond before ramping up production, and arguing that this strategy makes Shein a role model for other clothing manufacturers.[176]

Thus, consumer awareness of sustainability concerns in fashion has increased, at

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170 Manuel Baigorri, Shein Private *Bids Imply $30 Billion Valuation Drop Since April, Sources Say*, BLOOMBERG TECH.: DEALS (July 25, 2022), https://www.bloomberg.com/news/articles/2022-07-25/shein-private-bids-imply-30-billion-valuation-drop-since-april#xj4y7vzkg.

171 *See* Linah Mohammad et al., *Shein Sales Are Slowing Down. Is the End Near for the Fast Fashion Giant?*, NPR (Feb. 15, 2023), https://www.npr.org/2023/02/15/1157280019/shein-sales-are-slowing-down-is-the-end-near-for-the-fast-fashion-giant.

172 Walter Loeb, *Shein, Global Fashion Manufacturer, Will Go Public In 2024*, FORBES (Dec. 11, 2023) https://www.forbes.com/sites/walterloeb/2023/12/11/shein-global-fashion-manufacturer-will-go-public-in-2024/?sh=cd5121632208.

173 Mohammad et al., *supra* note 171.

174 *Id.*

175 Bruce Einhorn & Daniela Wei, *Fast-Fashion Behemoth Shein Says It's Cleaning Up Its Act. Will Anyone Buy It?*, BLOOMBERG: BUSINESSWEEK (July 12, 2022), https://www.bloomberg.com/news/features/2022-07-13/shein-s-fast-fashion-waste-concerns-could-harm-ipo.

176 *Id.*

least in part, due to publicity surrounding greenwashing lawsuits against fashion brands. While the secondhand clothing market grows, some consumers continue to defend fast fashion retailers due to their low prices. But as more consumers move away from fast fashion brands, retailers will have to evolve or die. Consumers who can afford to shop sustainably should make more of an effort to do so, so that the burden does not fall on consumers who do not have the financial means to make as great of a change.

IV. CONCLUSION

The fashion industry is a major contributor to global pollution and climate change. Greenwashing lawsuits brought by the FTC, consumers, states, and shareholders, are beginning to shine a light on the problem, despite varying success in the courts. Nonetheless, greenwashing litigation may be the catalyst to spur some structural changes in the fashion industry like greater scrutiny of fashion sustainability indexes, a push for legislation regulating the fashion industry, and increased consumer awareness of unsustainable brands. But this is just a start. Specifically, a new and more independent fashion sustainability index needs to be promulgated, legislators need to pass fashion legislation (rather than just proposing it), and consumers need to take action by moving their business away from unsustainable retailers.

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Conservation in the Shadow of Development: How Section 7 of the Endangered Species Act Impacts Federal Projects

By Elizabeth Black

I. INTRODUCTION

When former President Nixon signed the Endangered Species Act (ESA) into law, it was the most comprehensive legislation enacted to protect vulnerable wildlife in the

United States (U.S.).[1] The ESA specifically declares that all federal agencies *shall* seek to conserve endangered and threatened species—a powerful mandate.[2] The Act originally passed with overwhelming bipartisan support, with President Nixon stating that "Americans are more concerned than ever with conserving our natural resources."[3] The far-reaching implications of this mandate were yet to be realized.

The purpose of the ESA is to "provide a program for the conservation of such endangered species and threatened species."[4] One such program is interagency cooperation governed by Section 7 of the ESA.[5] Section 7 of the ESA places a dual mandate on federal agencies: the affirmative conservation mandate and the jeopardy prohibition.[6] Section 7(a)(1) requires federal agencies to participate in conservation of protected species and Section 7(a)(2) requires federal agencies to ensure that their actions will not jeopardize any listed species.[7] In the words of Former Chief Justice Burger: "One would be hard pressed to find a statutory provision whose terms were any plainer than those in [Section] 7 of the [ESA]. Its very words affirmatively command all federal agencies 'to insure that actions authorized, funded, or carried out by them do not jeopardize the continued existence' of an endangered species."[8]

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1 Fiona Kennedy, *A History of The Endangered Species Act*, EARTHDAY (Mar. 3, 2022), https://www.earthday.org/a-history-of-the-endangered-species-act/.

2 Endangered Species Act, 16 U.S.C. § 1531(c)(1).

3 Presidential Statement on Signing the Endangered Species Act of 1973, 1973 PUB. PAPERS 1027, 1027 (Dec. 28, 1973); Jeremy T. Bruskotter et al., *Support for the U.S. Endangered Species Act Over Time and Space: Controversial Species Do Not Weaken Public Support For Protective Legislation*, CONSERVATION LETTERS, 2018, at 1, 7.

4 16 U.S.C. § 1531(b).

5 *See generally id.* § 1536.

6 Mary C. Wood, *Protecting Wildlife Trust: A Reinterpretation of Section 7 of the Endangered Species Act*, 34 ENV'T. L. 605, 607 (2004); *see also* 16 U.S.C. § 1536(a)(1).

7 16 U.S.C. § 1536(a)(2).

8 Tenn. Valley Auth. v. Hill, 437 U.S. 153, 173 (1978) (quoting 16 U.S.C. § 1536) (emphasis omitted).

Section 7 requires that federal agencies consult with the U.S. Fish & Wildlife Service (FWS) for any federal action with a federal nexus, mandated by incredibly strong language.[9] The strong mandates of Section 7 have generated criticism about the impact of the consultation process on federal projects that are rooted in economic growth and development.[10]

> Part I of this note discusses the perceived impact of the Section 7 consultation process on federal projects, and how the narrative surrounding the consultation process among legislators is negative due to perceived delays. Part II discusses an option to expedite the consultation process, through a proposed amendment to reduce the federal consultation timeline and a new initiation designed by the FWS called programmatic consultations. Part III is a dual case study: Section A discusses the impact of a programmatic biological opinion on the population of the Indiana bat and Section B discusses how exemption of the construction of the border wall from the consultation requirement impacts the nearly extinct ocelot. Finally, Part IV responds to the criticisms of the consultation process by looking at the data, demonstrating that the negative reputation of the consultation process is not reflective of the actual implementation of Section 7.

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9 *See id; ESA Section 7 Consultation*, U.S. FISH & WILDLIFE SERV., https://www.fws.gov/service/esa-section-7-consultation (last visited Apr. 27, 2024).

10 *2016 Republican Party Platform*, AM. PRESIDENCY PROJECT (July 18, 2016) https://www.presidency.ucsb.edu/documents/2016-republican-party-platform#resources.

II. WE ONLY VOTED "TO PROTECT EAGLES, BEARS, AND WHOOPING CRANES," OH MY![11]

Section 7 of the ESA establishes a consultation process for all federal actions to insure that "any action authorized, funded, or carried out by such agency . . . is not likely to jeopardize the continued existence of any endangered species."[12] The wide range of projects with a federal nexus (i.e., any activities that a federal agency authorized, funded, or carried out) make the potential impact of Section 7 extensive, particularly with respect to projects on public land.[13] The true extent of Section 7 was not realized at the time of signing, but it would quickly become apparent.[14]

Section 7's powerful teeth were first realized in the events surrounding the Tellico Dam project. In 1967, Congress authorized funding for the Tennessee Valley Authority (TVA) to begin construction on the Tellico Dam in an area of the Little Tennessee River.[15] The project was designed to stimulate development and improve the local economy by creating 6,600 new jobs.[16]

In the summer of 1973—the same year the ESA was enacted—the snail darter, a three-inch-long fish, was discovered in the area and subsequently listed as endangered.[17]

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11 Taylor Smith, *It's Time to Endanger the Endangered Species* Act, TOWNHALL (Jan. 6, 2015), https://townhall.com/tipsheet/townhallmagazine/2015/01/06/its-time-to-endanger-the-endangered-species-act-n1939173 (quoting Lynn Greenwalt, director of FWS from 1973 to 1980).

12 16 U.S.C. § 1536(a)(2).

13 Ike C. Sugg, *Caught in the Act: Evaluating the Endangered Species Act, Its Effects on Man, and Prospects for Reform*, 24 CUMB. L. REV. 1, 29–30 (1993).

14 Bruskotter et al., *supra* note 3, at 1.

15 *Telling the Story of Tellico: It's Complicated*, TENN. VALLEY AUTH., https://www.tva.com/about-tva/our-history/built-for-the-people/telling-the-story-of-tellico-it-s-complicated (last visited Apr. 27, 2024).

16 *Id.*

17 *Id.*

A few years later, environmental groups brought action under the ESA to enjoin TVA from finishing the Tellico Dam—then ninety percent complete.[18] After a long tangle of lawsuits and administrative proceedings, the battle came to the Supreme Court in the landmark case of *Tennessee Valley Authority v. Hill*.[19] The court held that operating the Tellico Dam would violate the core purpose of the ESA, and the statutory language of Section 7 allows for no exception.[20] The Tellico Dam was thereby enjoined from operation.[21] The events of the Tellico Dam controversy highlighted the potential reach of Section 7 on federal projects. With the demonstrated ability to stop federal projects, Section 7 carved out a controversial reputation for itself.[22]

The Tellico Dam controversy demonstrated a more specific concern regarding the far-reaching power of Section 7—that it "impedes planning and development by requiring lengthy consultations and costly modifications to projects to accommodate species."[23] Three years after the passage of the ESA, the U.S. Government Accountability Office (GAO) reviewed the programs of the ESA and found that while the consultation process continually improved, conflicts between planned projects and FWS were not always identified and resolved promptly.[24] And, as more species are added to the endangered or threatened species list, conflicts between federal agencies and Section 7 mandates are likely

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18 *Id.*; *Hill*, 437 U.S. at 164.

19 *See generally Hill*, 437 U.S. at 153.

20 *Id.* at 172–73.

21 *Id; see also Telling the Story of Tellico: It's Complicated*, *supra* note 15 (noting that the Tellico Dam was exempted from the ESA and began operating in 1980).

22 Bruskotter et al., *supra* note 3, at 1–2.

23 JIM LYONS, UNDER THREAT: THE ENDANGERED SPECIES ACT AND THE PLANTS AND WILDLIFE IT PROTECTS 9 (2017).

24 U.S. GOV'T ACCOUNTABILITY OFF., CED-79-65, ENDANGERED SPECIES—A CONTROVERSIAL ISSUE NEEDING RESOLUTION 39–46 (1979).

to become more common.[25]

The same concerns that became apparent at the outset of the ESA are still felt today. A study by the Defenders of Wildlife Endangered Species Conservation Program found that twenty percent of formal consultations between 2008 and 2015 took longer than the statutory limit of 135 days.[26] A 2017 report by the Department of the Interior found that "the time and expense associated with satisfying the interagency consultation requirements are unnecessarily burdensome."[27]

Legislative attacks designed to weaken the ESA reflect the concerns surrounding the powerful impact of Section 7.[28] Although originally passed with bipartisan support, collaboration between legislators has diminished, and environmental policy is increasingly political in nature.[29] In fact, the 2016 Republican platform argued that "the ESA has stunted economic development, halted the construction of projects, burdened landowners, and has been used to pursue policy goals inconsistent with the ESA—all with little to no success in the actual recovery of species."[30]

The increasing political nature of environmental policy, including Section 7 of the ESA, is driven by special economic interests that conflict with protecting species.[31] Due to continued concerns regarding Section 7's strength and its impact on economic and

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25 *Id.* at 61.

26 Jacob W. Malcom & Ya-Wei Li, *Data Contradict Common Perceptions About a Controversial Provision of the US Endangered Species Act*, 112 PROC. OF THE NAT'L ACAD. OF SCI. 15844, 15848 (2015).

27 *Final Report: Review of the Department of the Interior Actions that Potentially Burden Domestic Energy*, 82 Fed. Reg. 50,532, 50,546 (Nov. 14, 2017).

28 *See generally* JAMIE PANG & NOAH GREENWALD, POLITICS OF EXTINCTION: THE UNPRECEDENTED REPUBLICAN ATTACK ON ENDANGERED SPECIES AND THE ENDANGERED SPECIES ACT (2015).

29 *Id.* at 3.

30 *2016 Republican Party Platform*, *supra* note 10.

31 PANG & GREENWALD, *supra* note 28, at 3.

industrial development, there has been an increase in legislative attacks against the ESA.[32] Between 1996 and 2010, there were 69 legislative attacks on the ESA, but between 2011 and 2017, there were 164 legislative attacks.[33] Most of these attacks are designed to limit or remove protections for specific endangered or threatened species, but there are also some attempts to *amend* the ESA.[34] A popular proposed amendment to the ESA is an expedited formal consultation process.[35] Additionally, legislators routinely propose federal projects be exempt from the requirements of Section 7 consultation, usually in the form of a "rider."[36]

III. LEGISLATIVE ACTION THAT AFFECTS THE IMPACT OF SECTION 7

In March 1998, the FWS released a Section 7 Consultation Handbook (Handbook), designed to promote efficiency and consistency of the consultation process.[37] The Handbook lays out the procedures for conducting Section 7 consultations and conferences, which helps clarify the complexities of the consultation process.[38]

Section 7 requires consultation with FWS for any project that is authorized, funded, or carried out by a federal agency or, in other terms, any project with a federal nexus.[39] This process begins with an informal consultation, initiated by the federal agency when a

32 *Id.* at 4.
33 *Id.*
34 *Id.*
35 *See* discussion *infra* Part II.A.
36 *See* discussion *infra* Part II.B.
37 U.S. FISH AND WILDLIFE SERV. & NAT'L. MARINE FISHERIES SERV., CONSULTATION HANDBOOK: PROCEDURES FOR CONDUCTING CONSULTATION AND CONFERENCE ACTIVITIES UNDER SECTION 7 OF THE ENDANGERED SPECIES ACT (1998) [hereinafter FWS HANDBOOK].
38 *See id.*
39 *ESA Section 7 Consultation*, *supra* note 9.

project may affect a listed species or critical habitat.[40] The federal agency creates a biological assessment that details the effect of its project, which is then reviewed by FWS.[41] If FWS concludes that there is no adverse effect on any listed species or critical habitats then the project may proceed as planned with no formal consultation required (but the project is still subject to Section 9 prohibitions against takings).[42] However, if FWS concludes there will be an adverse effect on a listed species or critical habitat, then a formal consultation under Section 7 is initiated.[43]

While there is no statutorily designated timeline for informal consultations, the Handbook requires that the biological assessment must be submitted within 180 days of the federal agency receiving the list of species from FWS.[44] Once submitted, FWS will respond within thirty days to determine if the agency action will be adverse to a listed species and thus subject to formal consultation.[45] Federal action subject to formal consultation may not proceed until the consultation process is complete.[46] Formal consultation may last up to ninety days, after which FWS will have forty-five days to prepare and deliver a biological opinion.[47] The biological opinion states whether the agency has "ensured that its action is not likely to jeopardize the continued existence of a listed species and/or result in the destruction or adverse modification of critical habitat" and

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40 *Id.*
41 *Id.*
42 *Id*; *see also* 16 U.S.C. § 1538.
43 *ESA Section 7 Consultation*, *supra* note 9.
44 FWS HANDBOOK, *supra* note 37, at 3-1.
45 *Id.* at 3-2–3-3.
46 *ESA Section 7 Consultation*, *supra* note 9.
47 *Id.*

usually includes conservation recommendations.[48] In total, formal consultation lasts about 135 days, assuming the project even necessitates a formal consultation with FWS.[49]

A. SPEEDING THINGS UP: PROPOSALS TO EXPEDITE THE FORMAL CONSULTATION PROCESS

A central criticism of the consultation requirement is that it causes delays and uncertainty in project development.[50] To alleviate this burden, there have been several proposals to amend Section 7 of the ESA to allow federal agencies to expedite the formal consultation process.[51]

Bills that call for an expedited consultation timeline attempt to amend Section 7 by reducing the formal consultation timeline from ninety to sixty days.[52] This amendment would cut the statutory limit of formal consultation from 135 days to 105 days.

During its investigation into the efficiency of the consultation process, the GAO found that "of the 42 [formal] consultations initiated in FWS regions I and IV during the first [four] months of 1978, 24 biological opinions (57[%]) were not rendered in 60 days."[53] Of the same forty-two formal consultations, only eleven of them, or twenty-six percent, exceeded the ninety-day statutory requirement.[54] Additionally, eight of these requests for formal consultations were returned to the federal agencies, requesting additional

48 *Id.*

49 FWS HANDBOOK, *supra* note 37, at 5-3.

50 LYONS, *supra* note 23, at 1.

51 *See Attacks on the Endangered Species Act*, CTR. FOR BIOLOGICAL DIVERSITY ACTION FUND, https://centeractionfund.org/endangered-species-act/ (last updated Jan. 2024); *see also* START Act, S. 4815, 117th Cong. (2022).

52 S. 4185.

53 U.S. GOV'T ACCOUNTABILITY OFF., *supra* note 24, at 42; *see Our Regions*, U.S. FISH AND WILDLIFE SERV., https://www.fws.gov/about/regions (last visited Apr. 27, 2024).

54 U.S. GOV'T ACCOUNTABILITY OFF., *supra* note 24, at 46.

information or further studies.[55]

Reducing the formal consultation timeline will likely result in a heightened perception of delays caused by the perceived inefficiencies of FWS. A quicker formal consultation period will also likely result in more actual delays due to federal agencies' failure to provide detailed information regarding their project's impact on endangered species. For example, one of the returned requests in the GAO's report was subject to this delay because the U.S. Army Corps of Engineers (the Corps) did not provide the requested information on their project's impact.[56] The Corps argued that extensive studies would be required to determine the impact, which could result in a separate but considerable time delay.[57] FWS issued a jeopardy biological opinion because the Corps could not ensure their project would not jeopardize a listed species.[58]

While an expedited formal consultation process is a frequent proposed amendment among legislators, none have successfully passed.[59] However, in response to the concern of potential delays of the consultation process, FWS and the U.S. Bureau of Land Management implemented a new initiative referred to as "programmatic" consultations.[60]

Programmatic consultations are intended to reduce the workload of the traditional consultations by reducing the need for individual traditional consultations.[61] There are two

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55 *Id.* at 43.

56 *Id.*

57 *Id.*

58 *Id.*

59 *Cf.* START Act, S. 4815, 117th Cong. (2022) (proposing to expedite the consultation process but has not yet been passed).

60 U.S. GOV'T ACCOUNTABILITY OFF., GAO-04-93, ENDANGERED SPECIES: MORE FEDERAL MANAGEMENT ATTENTION IS NEEDED TO IMPROVE THE CONSULTATION PROCESS 25 (2004).

61 *Id.*

programmatic consultation approaches. The first "combin[es] multiple proposed activities into a single consultation rather than consulting on each individual activity."[62] The second creates a more predictable approval process by providing specific design criteria.[63]

Developing programmatic consultations is initially lengthy and difficult because of the complexities of multiple proposed projects in a single area.[64] However, programmatic consultations reduce the number of individual consultations required, thus reducing the chance of delay that a traditional consultation process may implicate.[65] The use of programmatic consultations as a regulatory response to the criticisms of traditional Section 7 consultations may serve to ease the concerns that an expedited formal consultation is meant to address.

B. THESE RULES CANNOT STOP ME: BILL RIDERS AND THEIR DIRECT IMPACT ON ENDANGERED SPECIES

A second type of legislative attack on the ESA is bill riding, where legislators attach exemptions from federal regulations, like the consultation requirement in Section 7 of the ESA, for federal projects on must-pass bills.[66] A 'rider' is a "*non-germane* amendment to a bill or appropriations bill that changes the permanent law governing a program funded by the bill."[67] While a rider may not be a direct change or amendment of the ESA, it weakens the impact of Section 7 and lessens the protections for species affected by a federal project.[68]

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62 *Id.*
63 *Id.* at 25–26.
64 *Id.*
65 *Id.*
66 PANG & GREENWALD, *supra* note 28, at 3.
67 *Id.* at 4.
68 *Id.*

The use of riders on budget and spending legislation has increased: of the 164 legislative attacks on the ESA between 2011 and 2017, 54 of them have been riders, with no relevance to congressional spending habits.[69] These riders would not pass as a standalone bill, but with their increasing frequency there is a concern that more of these riders will pass, ultimately threatening the protection of endangered species and undermining the intent of the ESA.[70]

The first use of a rider to preclude Section 7 enforcement followed the decision regarding the operation of the Tellico Dam.[71] A Tennessee Senator added a rider that exempted the Tellico Dam from the requirements of the ESA to the 1980 Public Works Appropriations Bill, all of which was signed into law by former President Carter.[72] Because the exemption was signed into law, the Tellico Dam could complete operation and became operational, despite all of the prior legislative and judicial actions.[73]

Using a rider to waive the consultation process for a federal project is distinct from waivers allowed under Section 7(p).[74] Section 7(p) exemptions apply to specific situations of a presidentially declared major disaster area.[75] In these instances, the president may exempt federal actions from the consultation requirements of Section 7 to "repair or

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69 *Id.*

70 *Id.* at 5.

71 *Telling the Story of Tellico: It's Complicated*, *supra* note 15.

72 *Id.*

73 *Id.*; *see also* Press Release, U.S. Dept. of the Interior, Department of the Interior Celebrates Recovery of the Snail Darter: U.S. Fish and Wildlife Service Finalizes Endangered Species Act Delisting of the Tennessee Fish, (Oct. 4, 2022) (celebrating the delisting of the snail darter due to a successful translocation program).

74 CONG. RSCH. SERV., R46867, ENDANGERED SPECIES ACT (ESA) SECTION 7 CONSULTATION AND INFRASTRUCTURE PROJECTS 14 (2021).

75 *Id.*

[replace] a public facility substantially as it existed prior to the disaster."[76]

There are other examples of Congress allowing a federal project to be exempt from the consultation requirement, such as delegating the authority to waive requirements to other federal agencies.[77] In this instance, a federal project may be exempt from the Section 7 consultation process when the respective federal agency, particularly those that regulate infrastructure, makes that determination based on other statutory authority or the practice of bill riding.[78]

While most riders are unlikely to pass, they signal that there is a trend toward political influence on enforcement of the ESA.[79] Additionally, the riders that do pass directly impact endangered and threatened species.[80]

IV. A TALE OF TWO SPECIES: THE IMPACTS OF A STREAMLINED ENDANGERED SPECIES ACT

A. IMPACT OF A PROGRAMMATIC BIOLOGICAL OPINION ON THE RANGE OF THE INDIANA BAT

As discussed above, a programmatic consultation is designed to streamline the consultation process by "addressing multiple actions on a program, regional, or other basis, and may also expedite permitting process for such actions."[81] Recently, FWS, the U.S. Federal Highway Administration, the U.S. Federal Railroad Administration, and the U.S. Federal Transit Administration worked in conjunction to create a programmatic biological

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76 *Id.*

77 *Id.*

78 *Id*; *see supra* Part III.B.

79 PANG & GREENWALD, *supra* note 28, at 3.

80 *Id.*

81 U.S. FISH & WILDLIFE SERV., PROGRAMMATIC BIOLOGICAL OPINION FOR TRANSPORTATION PROJECTS IN THE RANGE OF THE INDIANA BAT AND THE NORTHERN LONG-EARED BAT 1 (2018).

opinion to "streamline consultation and improve conservation for two listed bat species[:]" the Indiana bat and the northern long-eared bat.[82] This biological opinion applies to common types of transportation projects in the range of the bats' habitats, however, separate Section 7 consultations are required for projects that fall out of this scope or those that may affect other listed species.[83]

The Indiana bat is a small migratory bat found in much of the eastern U.S.[84] The population has declined by half since it was listed in 1966, and since the arrival of white-nose syndrome in the U.S. in 2007, the population has declined by another nineteen percent.[85] The main threats to the Indiana bat vary, but human disturbance and degradation of habitat are the main concerns.[86]

With respect to federal projects in the habitat ranges of the Indiana bat, stressors include noise and vibration from construction, tree removal, lighting, air quality, and water quality.[87] These stressors can lead to a direct impact on the population of the Indiana bat, but tree removal during their active season habitat is the most likely stressor to cause an adverse effect.[88] Despite the stressors and their effects on the Indiana bat, FWS determined that transportation activities are not likely to jeopardize the continued existence of the Indiana bat.[89] FWS also determined that the designated critical habitat of the Indiana bat is

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82 *Id.*

83 *Id.*

84 *Indiana Bat,* U.S. FISH & WILDLIFE SERV., https://www.fws.gov/species/indiana-bat-myotis-sodalis (last visited Apr. 27, 2024).

85 *Id.*

86 *See* U.S. FISH & WILDLIFE SERV., *supra* note 81, at 66–76.

87 *Id.*

88 *Id.* at 138.

89 *Id.* at 137.

not adversely affected by these projects.[90]

The programmatic biological opinion for the Transportation Agencies also includes conservation recommendations.[91] Of these recommendations, FWS suggested funding and keeping records about the Indiana bats and their distribution in an effort to build knowledge and status relevant for the future of the bat.[92] Programmatic consultations can be beneficial to obtaining more standardized information about the status of a protected species and the impacts of projects in the area, without the potential delays of individual consultations under Section 7.

While the programmatic approach to biological opinions is designed to be more efficient than traditional consultations under Section 7, environmentalists argue that this approach hurts protected species, as consultations are not as robust as they would be under the traditional consultation regime.[93] An investigation by the GAO found that the effectiveness of the programmatic approach is unclear because FWS has not completed a comprehensive evaluation.[94] Essentially, the programmatic approach was developed in response to limited resources of FWS, and, because of those limited resources, it is difficult to ascertain the nuances of how effective the protections are.[95]

B. THE BORDER WALL: DESTINED TO SEPARATE MORE THAN JUST HUMANS

One way to work around the consultation process is to exempt a specific federal

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90 *Id.*
91 *Id.* at 145.
92 *Id.* at 146.
93 *See* U.S. GOV'T ACCOUNTABILITY OFF., GAO-04-93, *supra* note 60, at 29.
94 *Id.*
95 *Id.*

project from the consultation requirements of Section 7.[96] Congress can accomplish this by delegating authority to federal agencies to waive ESA consultation requirements (usually, this delegation would go to agencies that regulate infrastructure).[97] For example, Section 102 of the Illegal Immigration Reform and Immigrant Responsibility Act of 1996 (IIRIRA) allows the Secretary of Homeland Security to "take such actions as may be necessary to install additional physical barriers and roads (including the removal of obstacles to detection of illegal entrants) in the vicinity of the United States border to deter illegal crossings in areas of 'high illegal entry' into the United States."[98] The Secretary has recently used this authority to exclude construction of the border wall from Section 7 consultation and other federal regulations.[99]

The border wall exemption applies to construction in the Rio Grande Valley, which the Secretary determined to be an area of high entry.[100] Exemption of the consultation requirement for this section of the border wall is significant because of a direct impact on a listed species that occupies the same area—the ocelot.[101]

The ocelot is a wild cat with chain-like spots that run along their body.[102] Although ocelots have been listed as endangered since 1982, FWS has not made a designation of

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96 *See* discussion *supra* Part II.

97 CONG. RSCH. SERV., *supra* note 74, at 14.

98 *Id.*

99 *See* Determination Pursuant to Section 102 of the Illegal Immigration Reform and Immigrant Responsibility Act of 1996, as Amended, 88 Fed. Reg. 69,214, 69,215 (Oct. 5, 2023).

100 *Id.* at 69,214 ("As of early August 2023, Border Patrol had encountered over 245,000 such entrants attempting to enter the United States between ports of entry in the Rio Grande Valley Sector in Fiscal Year 2023.").

101 Krista Schlyer, *Walled Off: A "Big, Beautiful Wall" Would Devastate Wildlife Populations on Both Sides of the Border*, DEFS. OF WILDLIFE (2018), https://defenders.org/magazine/winter-2018/walled.

102 *Ocelot*, U.S. FISH & WILDLIFE SERV., https://www.fws.gov/species/ocelot-leopardus-pardalis (last visited Apr. 27, 2024).

critical habitat due to potential threats of poaching.[103] There are roughly sixty ocelots that are concentrated in two small population groups in the Rio Grande Valley.[104] The FWS recovery plan identified habitat fragmentation and loss as the main threat to the survival of the ocelot, especially as the consequence of habitat fragmentation is the separation of the viable population groups.[105]

The ocelot habitat extends across the border and into Mexico, where ocelots are also endangered.[106] The best chance the ocelots have for survival is to connect the viable population groups that extend throughout the Rio Grande Valley and Mexico.[107] Although the exemptions granted to the Rio Grande Valley border wall by the IIRIRA is a recent update, there is already evidence that the genetic diversity of the ocelot is eroding as the populations become more isolated, which would be exacerbated as the physical barriers increase.[108] Because the most substantial threat to the ocelot is habitat fragmentation, the impact of a more robust border wall could be disastrous and ultimately lead to the ocelot's extinction.[109]

V. IS SECTION 7 ENFORCEMENT HINDERING ECONOMIC GROWTH AND DEVELOPMENT?

Prevalent criticism of Section 7 of the ESA rests on the assumption that the ESA

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103 *Action Timeline*, CTR. FOR BIOLOGICAL DIVERSITY, https://www.biologicaldiversity.org/species/mammals/ocelot/action_timeline.html (last visited Apr. 27, 2024).

104 Schlyer, *supra* note 101; *Ocelot*, *supra* note 102.

105 Endangered and Threatened Wildlife and Plants; Draft Ocelot (LEOPARDUS PARDALIS) Recovery Plan, First Revision, 75 Fed. Reg. 52,547, 52,548 (Aug. 26, 2010).

106 *Ocelot*, *supra* note 102.

107 75 Fed. Reg. at 52,548.

108 Schlyer, *supra* note 101.

109 *Id.*

constrains economic growth and industrial development by stopping or adversely modifying federal projects during the consultation process.[110] This perception is used to justify legislative attacks on Section 7, many of which are driven by special interests of legislators that aim to weaken or overturn the ESA.[111] These legislative attacks include potential amendments that expedite consultation time, which are reflected in new regulatory initiatives, like the programmatic approach to biological opinions.[112] An additional legislative attack is complete exemption of federal projects from consultation requirements in the form of riders or agency delegations.[113]

The justification of these amendments, legislative attacks, and regulatory schemes perpetuate the narrative that Section 7 is ineffective and slows development.[114] However, the controversy surrounding Section 7 consultation requirements is not backed by data.[115] A study published by the Proceeding of the National Academy of Sciences demonstrates that FWS consultations "very rarely concludes jeopardy or destruction/adverse modification and that the median duration of formal consultations is well below the statutory limit."[116] Additionally, of the 88,290 federal actions that occurred between the years of 2008 and 2015 that FWS consulted on, *none* were stopped or extensively altered.[117] The authors argue that their findings should ease some common misconceptions of the implementation of Section 7, so that future efforts can focus on the actual

110 Malcom & Li, *supra* note 26, at 15,844.
111 PANG & GREENWALD, *supra* note 28, at 2.
112 *See supra* Part II.A.
113 *See supra* Part II.B.
114 Malcom & Li, supra note 26, at 15,844.
115 *See generally id.*
116 *Id.* at 15,846.
117 *Id.*

effectiveness of the ESA.[118] Essentially, because the data showed that federal action is rarely stopped or modified based on Section 7, relying on anecdotal evidence of delays to decide environmental policy is problematic.[119]

Another study found that public support for the ESA transcends political ideology and that environmental policy is likely driven by narrow business interests and wealthy elites.[120] The authors argue that if the ESA is truly increasing in controversy in the media, there would be evidence of a more polarized public response.[121] Instead, the authors found that less than ten percent of the population expressed opposition towards the ESA.[122] While the study primarily focuses on public opinion surrounding the listing or delisting of controversial species, it concludes "that the ESA is commonly portrayed in a manner that is inconsistent with how [the ESA] is viewed among the American public."[123]

These studies highlight a disconnect between legislators and the public about the actual impact of Section 7 on federal projects. Legislators, particularly Republican legislators, call for changes that weaken or overturn the ESA based on the theory that it has "stunted economic development [and] halted the construction of federal projects."[124] But in reality, these changes or amendments to the ESA would likely not have the intended impact, as formal consultations with FWS are not significantly hindering federal projects.[125]

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118 *Id.* at 15,848–49.
119 *See id.* at 15,846.
120 Bruskotter et al., *supra* note 3, at 6.
121 *Id.* at 5.
122 *Id.* at 6.
123 *Id.*
124 PANG & GREENWALD, *supra* note 28, at 1; *2016 Republican Party Platform*, *supra* note 10.
125 Malcom & Li, *supra* note 26, at 15,846.

In fact, implementing the proposed changes would likely have adverse effects on conservation beyond harm to specific species. An expedited consultation process, whether by statutory or regulatory changes, may not effectively protect species.[126] Exemptions of federal projects through bill riding or executive orders cut directly against policy learning—the idea that federal agencies are planning and proposing projects with reduced impact and coordinating with FWS to obtain approval more predictably and quickly.[127] By allowing more federal projects to be exempt from the requirements of Section 7, it signals to future projects that there is no incentive to consider plans with a reduced impact on species, even though it is highly unlikely that a federal project will be stopped or adversely modified in the first place.[128]

VI. CONCLUSION

When Congress passed the ESA, nobody could have predicted the reach that enforcement of the Act would have over economic and industrial development. In the early years of the Act, Section 7 carved out a powerful reputation for itself, one that perpetuates today.[129] What some consider powerful protections for conservation, others consider burdensome, inconvenient, and costly.[130]

To alleviate the burden of Section 7 consultation requirements, both legislators and FWS have implemented their own amendments and initiatives. Republican legislators have increased legislative attacks on the ESA, with different amendments that aim to weaken or

126 U.S. GOV'T ACCOUNTABILITY OFF., GAO-04-93, *supra* note 60, at 29.
127 Malcom & Li, *supra* note 26, at 15,847.
128 *Id.* at 15,845–47.
129 *Id.* at 15,844.
130 *See* PANG & GREENWALD, *supra* note 28, at 3.

nullify the ESA.[131] Part II discussed one frequent amendment aimed at limiting the formal consultation time from ninety days to sixty days and how that would impact the reputation of Section 7.[132] If an accelerated timeline is not met by FWS in returning biological opinions, perceptions of undue delays are likely to be more common, thus negative perceptions of Section 7 are likely to become more popular.

Along with legislative attempts to expedite the consultation process, FWS has implemented an option for a programmatic consultation process. This reduces the need for individual consultations for projects in a designated area occupied by a protected species.[133] The Indiana bat is the subject of a programmatic biological opinion, and while the effectiveness of programmatic biological opinions has not been comprehensively studied, the benefits are obvious.

With respect to the concerns of project delays from Section 7 consultation, a programmatic approach would help streamline the consultation process while maintaining the positive reputation of the consultation process, in a way that an expedited amendment would not.[134]

Another option to remove the burden of Section 7 consultation is an exemption of the federal project from consultation requirements and other federal or state regulations.[135] However, the effects of an exemption can be devastating for a protected species.[136] Exemptions completely undercut the main goal of the ESA—the conservation and

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131 *Id.*
132 *See* discussion *supra* Part II.A.
133 U.S. GOV'T ACCOUNTABILITY OFF., GAO-04-93, *supra* note 60.
134 *See* discussion *supra* Part II.A.
135 *See* discussion *supra* Part II.B.
136 *See* discussion *supra* Part III.B.

protection of vulnerable species.[137]

Section 7 is no stranger to controversy, but "[g]one are the days when [S]ection 7 made national headlines because it restricted the logging of old-growth forests or halted the completion of a $100 million dam on the Little Tennessee River."[138] The conflicting storylines of Section 7 create a drive to amend the ESA, both from proponents and opponents. There needs to be a balance between those who seek to enforce protection for vulnerable species and those who value industrial and economic development. Some proposals will balance these interests more than others, as demonstrated by the different options of expedited consultations.[139]

The most important consideration regarding the ESA is relying on data to make informed decisions about how to modify the consultation process. Justifications that rest on assumptions that the consultation process is designed to restrict economic progress are not reflected in data.[140] The ESA was originally designed to rely on scientific data to protect vulnerable populations, and future modifications should be held to the same standard.[141]

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137 16 U.S.C. § 1531.
138 Malcom & Li, *supra* note 26, at 15,844.
139 *See* discussion *supra* Part II.A.
140 Malcom & Li, *supra* note 26.
141 *Id.*

which was instrumental in making this publication possible.

"F" is for Fracking and Forever Chemicals

By Melina Westerlind

I. INTRODUCTION

Synthetic chemicals can improve our everyday lives. But they can also cause significant harm—both to the environment and to humans.[1] Chemicals can enter the consumer market without adequate testing to prove that these chemicals are, in fact, safe.[2] Without this protective measure, citizens, governments, and companies all bear the consequences. This paper discusses forever chemicals, their threat to the environment and to humans, and their use in fracking operations.

First, this paper discusses the historical context of forever chemicals, specifically what these chemicals are, how these chemicals were first exposed to the public, their health effects, and how these chemicals made their way into drinking water systems.

Second, this paper analyzes the potential presence of forever chemicals in fracking operations. This discussion provides an overview of the fracking process and why forever chemicals can be useful in fracking. Then this section analyzes how these chemicals could contaminate groundwater through fracking.

Third, this paper examines federal and state fracking regulations. Federally, relevant statutes include the Resource Conservation and Recovery Act (RCRA), Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), Clean Water Act (CWA), and Safe Drinking Water Act (SDWA). This paper also examines applicable state laws of two states—Texas and Colorado.

Fourth, this paper focuses on regulatory initiatives by the Environmental Protection

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1 *See, e.g.*, Sandee LaMotte, *Plastics and Pesticides: Health Impacts of Synthetic Chemicals in US Products Doubled in Last 5 Years, Study Finds*, CNN (July 22, 2020), https://www.cnn.com/2020/07/21/health/chemical-endocrine-disruptor-doubled-wellness/index.html.

2 *See* Peter Lehner, *FDA Allows Secret, Untested Chemicals into Our Food*, EARTHJUSTICE (June 1, 2017), https://earthjustice.org/article/fda-allows-secret-untested-chemicals-into-our-food.

Agency (EPA) regarding forever chemicals. This includes various proposed and promulgated regulations, such as those regarding water quality standards, RCRA, CERCLA, and the Toxics Release Inventory (TRI).

Fifth, this paper discusses three recommended methods to remediate the United States (U.S.) water supply by removing forever chemicals from drinking water. The three processes are: (1) granular activated carbon, (2) ion exchange resins, and (3) high pressure membrane systems.

Sixth, this paper examines how Colorado and Texas are responding to the potential use of forever chemicals in fracking operations.

Seventh, and finally, this paper concludes by proposing potential responses to forever chemicals in fracking operations.

II. WHAT ARE FOREVER CHEMICALS?

A. FOREVER CHEMICALS ARE PFAS

Forever chemicals are a group of chemicals known as per-and polyfluoroalkyl substances (PFAS)[3] that have been used since the 1940s to create various products.[4] There are approximately 12,000 chemicals that fall under the PFAS umbrella.[5] The common chemical compound of this group contains at least one carbon-fluorine bond, which makes

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[3] *See Per- and Polyfluorinated Substances (PFAS) Factsheet*, CTR. FOR DISEASE CONTROL AND PREVENTION, https://www.cdc.gov/biomonitoring/PFAS_FactSheet.html#:~:text=Print-,Per%2D%20and%20Polyfluorinated%20Substances%20(PFAS),in%20a%20variety%20of%20products (last visited Apr. 24, 2024) [hereinafter *PFAS Factsheet*].

[4] *Our Current Understanding of the Human Health and Environmental Risks of PFAS*, ENV'T PROT. AGENCY, https://www.epa.gov/pfas/our-current-understanding-human-health-and-environmental-risks-pfas (last updated June 7, 2023) [hereinafter *Current Understandings*].

[5] Jessica Knoblauch, *Breaking Down Toxic PFAS*, EARTHJUSTICE (Oct. 19, 2021), https://earthjustice.org/feature/breaking-down-toxic-pfas.

PFAS persistent chemicals.[6]

PFAS includes the chemicals perfluorooctanoic acid (PFOA) and perfluorooctane sulfonate (PFOS).[7] These chemicals were the original PFAS, and they were first developed by 3M Company in the 1930s.[8] They were considered "miracle chemicals" because of their stain-, water-, oil-, and heat-resistant capabilities.[9] Since their development, PFOA and PFOS have been used in a wide range of products, like building materials, rain jackets, personal care products, artificial turf, food packaging, nonstick pans, medical supplies, and firefighting foam.[10]

Today, these chemicals have gone from "miracle chemicals"[11] to "forever chemicals."[12] So, what happened? Multiple studies revealed that these miracle chemicals,[13] with their premier resistance to the elements, are also resistant to degradation.[14] Thus, these chemicals bioaccumulate in the human body and do not degrade in the environment.[15] These chemicals exist forever.

B. HISTORY OF PFAS AND THE CASE THAT EXPOSED THEIR DANGER

In 1938, Dr. Roy Plunkett discovered Teflon, which DuPont later began

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6 Cindy Hogue et al., *A Guide to the PFAS Found in our Environment*, CHEM. & ENG'G NEWS, https://cen.acs.org/sections/pfas.html (last visited Apr. 24, 2024).

7 *Current Understandings*, *supra* note 4.

8 Amal Ahmed, *Thousands of Pounds of "Forever Chemicals" Have Been Injected into Texas Oil and Gas Wells, Study Finds*, TEX. TRIB. (Mar. 27, 2023), https://www.texastribune.org/2023/03/27/texas-fracking-oil-gas-wells-pfas-report/.

9 *Id.*; *PFAS Factsheet*, *supra* note 3.

10 *PFAS: The Forever Chemicals*, CLEAN WATER ACTION, https://cleanwater.org/pfas-forever-chemicals (last visited Apr. 24, 2024).

11 Ahmed, *supra* note 8.

12 *What are PFAS Chemicals?*, ENV'T WORKING GRP., https://www.ewg.org/what-are-pfas-chemicals (last visited Apr. 24, 2024).

13 Ahmed, *supra* note 8.

14 *Current Understandings*, *supra* note 4.

15 *PFAS Factsheet*, *supra* note 3.

manufacturing using a chemical called C8.[16] 3M produced C8, "defined as two chemicals–PFOA and PFOS . . ."[17] In 1953, 3M introduced PFOS into the consumer market through Scotchgard, and the FDA approved C8-containing Teflon cookware shortly after.[18] In the 1960s, 3M worked with the U.S. Navy to create aqueous film-forming foam, which contained both PFOA and PFOS.[19] From the 1960s to the 1980s, 3M, the Navy, and DuPont conducted studies that revealed adverse effects of PFOA and PFOS on humans and animals.[20] In 1999, EPA and 3M found that PFOS contaminated blood was beginning to appear in blood banks.[21] That same year, EPA began to audit 3M.[22] Meanwhile, in a seminal toxics lawsuit, a cattle farmer sued DuPont claiming significant harms due to DuPont's careless disposal of PFOA.[23] This suit shed light on the dark history of chemical pollution and PFAS.

1. TENNANT V. DUPONT

Wilbur Tennant sued DuPont after suffering several concerning injuries to his cattle business, namely that his cattle were behaving strangely, suffering from deformities, and

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16 *See TIMELINE for PFOS and PFOS Perfluorinated Chemicals Compiled by FAN's Pesticide Project*, FLUORIDE ACTION NETWORK PESTICIDE PROJECT, https://www.fluoridealert.org/wp-content/pesticides/effect.pfos.class.timeline.htm (last visited Apr. 24, 2024); *see also* Ahmed, *supra* note 8.

17 Jeffrey Kluger, *Companies Knew the Dangers of PFAS 'Forever Chemicals'—and Kept Them Secret*, TIME (June 1, 2023), https://time.com/6284266/pfas-forever-chemicals-manufacturers-kept-secret/#; Amy Linn, *Toxic Timeline: A Brief History of PFAS*, SEARCHLIGHT N.M. (Feb. 19, 2019), https://searchlightnm.org/toxic-timeline-a-brief-history-of-pfas/.

18 Linn, *supra* note 17.

19 *Id.*

20 *Id.*

21 *Id.*

22 Scott Faber, *For 20-Plus Years, EPA Has Failed to Regulate 'Forever Chemicals,'* ENV'T WORKING GRP. (Jan. 9, 2020), https://www.ewg.org/research/20-plus-years-epa-has-failed-regulate-forever-chemicals.

23 Nathaniel Rich, *The Lawyer Who Became DuPont's Worst Nightmare*, N.Y. TIMES (Jan. 6, 2016), https://www.nytimes.com/2016/01/10/magazine/the-lawyer-who-became-duponts-worst-nightmare.html; Complaint, Tennant v. DuPont, No 6:99-cv-00488 (S.D. W. Va. June 11, 1999).

dying—with discolored organs.[24] Through discovery for the case, Tennant's lawyer discovered that DuPont had "dumped 7,100 tons of PFOA sludge" into a landfill adjacent to Tennant's property.[25] This sludge drained into the same creek that Tennant's cattle drank from.[26] In fact, DuPont also dumped this sludge in surface waters despite its knowledge of the adverse health effects of PFOA.[27] DuPont did not disclose this information to the public, whose drinking water had been contaminated, nor to Tennant.[28] Even though this case ultimately settled, Tennant's lawyer brought the findings to EPA's attention.[29] This case led to a settlement between EPA and DuPont requiring DuPont to pay $10.25 million in fines for failing to disclose the toxicity of PFOA.[30] Additionally, this case led to a class action lawsuit on behalf of citizens whose water supply had been contaminated, which DuPont settled for $405 million.[31] In 2006, DuPont, 3M, and other companies agreed with EPA to phase out PFOA and PFOS from production, and replace them with a safer, alternative chemical.[32]

C. HEALTH EFFECTS OF FOREVER CHEMICALS

Following the agreement, PFOA and PFOS were replaced with new chemicals called GenX Chemicals.[33] GenX Chemicals have a shorter chain of carbon atoms than

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24 Rich, *supra* note 23.
25 *Id.*
26 *Id.*
27 *Id.*
28 *Id.*
29 *Id.*
30 Faber, *supra* note 22.
31 HARV. L. & INT'L DEV. SOC'Y, LEACH V. E.I. DU PONT DE NEMOURS & CO. & RELATED CASES (RE PFOA EXPOSURE & CONTAMINATION IN THE US) 1.
32 Faber, *supra* note 22.
33 Jeffrey Kluger, *3M's Historic $10 Billion 'Forever Chemical' Payout is Just the Tip of the PFAS Iceberg*, TIME (June 23, 2023), https://time.com/6289893/3m-forever-chemical-pfas-settlement/#.

PFOA, with six carbon atoms compared to PFOA's eight carbon atoms.[34] In theory, the shorter carbon chain means that GenX Chemicals do not accumulate in humans as readily as longer-chained PFOAs.[35]

However, studies quickly showed that GenX chemicals are also toxic to humans. Various entities have conducted studies to determine how PFAS affect the human body. Humans are exposed to PFAS in consumer products, drinking water, and agriculture.[36] Specifically, peer-reviewed studies have found that certain levels of PFAS in the human body can lead to several health effects, including:

- Reproductive effects such as decreased fertility or increased high blood pressure in pregnant women.
- Developmental effects or delays in children, including low birth weight, accelerated puberty, bone variations, or behavioral changes.
- Increased risk of some cancers . . . .
- Reduced ability of the body's immune system to fight infections, including reduced vaccine response.
- Interference with the body's natural hormones.
- Increased cholesterol levels and/or risk of obesity.[37]

Exposure can also occur through inhalation or ingestion of contaminated goods.[38] When these chemicals bioaccumulate, they bind "to proteins in the blood, liver[,] and kidney."[39] Currently, only a select few PFAS have been tested to determine their risk to human health. However, studies have found that some chemicals slowly excrete out of the

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34 ENV'T PROT. AGENCY, HUMAN HEALTH TOXICITY ASSESSMENT FOR GENX CHEMICALS FACT SHEET 1 [hereinafter GENX CHEMICALS FACTSHEET].

35 *Id.* at 2.

36 *Understanding PFAS Exposure and Your Body*, AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY, https://www.atsdr.cdc.gov/pfas/health-effects/PFAS-exposure-and-your-body.html#:~:text=People%20may%20be%20exposed%20to,%2C%20wild%20game%2C%20and%20fish (last visited Feb. 25, 2024) [hereinafter *Understanding PFAS Exposure*].

37 *Current Understandings*, *supra* note 4.

38 *Id.*

39 Hubertus Brunn et al., *PFAS: Forever Chemicals—Persistent, Bioaccumulative and Mobile. Reviewing the Status and the Need for their Phase Out and Remediation of Contaminated Sites*, 35 ENV'T SCI. EUR. 1, 8 (2023).

human body over time.[40] How much is excreted depends on the health of the individual and whether the individual menstruates or produces breastmilk.[41]

EPA continues to test various chemicals under the PFAS umbrella.[42] For each chemical tested, EPA will release a "Human Health Toxicity Assessment."[43] Depending on the chemical, different levels of PFAS in the human body can cause various health effects.[44] For example, EPA issued a Human Health Toxicity Assessment for GenX Chemicals, which are the replacement for PFOA.[45] EPA found toxicity values, also known as oral reference doses (RfD), for the amount of GenX Chemicals "a person can ingest daily over a lifetime (chronic RfD) or less (subchronic RfD) that is unlikely to lead to adverse health effects in humans."[46] In other words, these values represent the daily dose of GenX Chemicals that a person can ingest without suffering health effects. The assessment determined that the chronic RfD is .000003 mg/kg-day for GenX Chemicals, and .00003 mg/kg-day for subchronic RfD.[47] This assessment is alarming because the exposure limit in the GenX Chemicals' Human Health Toxicity Assessment is lower than the exposure limit EPA set for PFOA.[48] This toxicity assessment is not enforceable, but provides data for EPA to establish drinking water standards for these chemicals in the

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40 *Understanding PFAS Exposure*, *supra* note 36.

41 *Id.* ("People who have kidney disease may not excrete as much PFAS from their body through their urine as healthy individuals. . . . Some PFAS routinely leave the body in blood during menstruation. Those who menstruate may excrete more PFAS than those who do not. Some PFAS can leave the body in breastmilk.")

42 *See Current Understandings*, *supra* note 4.

43 *Human Health Risk Assessment*, ENV'T PROT. AGENCY, https://www.epa.gov/risk/human-health-risk-assessment (last updated Dec. 6, 2023).

44 *Current Understandings*, *supra* note 4.

45 GENX CHEMICALS FACTSHEET, *supra* note 34.

46 *Id.* at 2.

47 *Id.* at 2–3.

48 Justin Boucher, *US EPA Publishes Final Toxicity Assessment for GenX Chemicals*, FOOD PACKAGING F. (Oct. 28, 2021), https://www.foodpackagingforum.org/news/us-epa-publishes-final-toxicity-assessment-for-genx-chemicals.

future.[49]

D. FOREVER CHEMICALS IN THE U.S. DRINKING WATER SYSTEM

The presence of forever chemicals in the U.S. drinking water systems has generated the most media attention. These chemicals enter drinking water through: "industrial release to water, air, or soil; discharges from sewage treatment plants; land application of contaminated sludge; leaching from landfills; and use of certain fire-fighting foams."[50] Studies noted that PFAS were prevalent throughout the U.S. in the 1990s when studies found PFAS "in the blood of the general human population."[51] In 2012, limited tests were available to detect PFAS in the U.S. drinking water systems.[52] Testing by EPA that year detected PFAS in four percent of the country's drinking water supplies.[53] In 2023, the U.S. Geological Survey found, "[a]t least 45% of the nation's tap water is estimated to have one or more types of the chemicals known as . . . PFAS."[54] However, it is difficult to detect all PFAS in tap water because there are so many chemicals and a lack of tests available.[55]

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49 Ron Tenpas et al., *EPA's Final Human Health Toxicity Assessment for PFAS GenX Chemicals*, VINSON & ELKINS (Jan. 26, 2022), https://www.velaw.com/insights/epas-final-human-health-toxicity-assessment-for-pfas-genx-chemicals/.

50 N.J. DEP'T OF HEALTH, PER- AND POLYFLUOROALKYL SUBSTANCES (PFAS) IN DRINKING WATER 1 (2023).

51 INTERSTATE TECH. REGUL. COUNCIL, HISTORY AND USE OF PER- AND POLYFLUOROALKYL SUBSTANCES (PFAS) FOUND IN THE ENVIRONMENT 1 (2020).

52 *Id*. at 2.

53 *Id.*

54 USGS Office of Communications and Publishing, *Tap Water Study Detects PFAS 'Forever Chemicals' Across the US*, U.S. GEOLOGICAL SURV. (July 5, 2023), https://www.usgs.gov/news/national-news-release/tap-water-study-detects-pfas-forever-chemicals-across-us (citing Kelly L. Smalling et al., *Per- and Polyfluoroalkyl Substances (PFAS) in the United States Tapwater: Comparison of Underserved Private-Well and Public-Supply Exposures and Associated Health Implications*, 178 ENV'T INT'L 108033).

55 NAT. RES. DEF. COUNCIL, NRDC POLICY BASIS FRACKING 1 (2013) [hereinafter NRDC POLICY BASIS].

III. FOREVER CHEMICALS IN FRACKING OPERATIONS

A. WHAT IS FRACKING?

Hydraulic fracturing, better known as fracking, occurs by "injecting water and chemicals deep into the earth at extremely high pressure to break up layers of rock that harbor deposits of natural gas and/or oil."[56] Fracking is an enhanced oil recovery technique, meaning it increases the amount of oil and natural gas produced by a well.[57] For the oil and gas industry, this is an innovative process because it allows extraction of oil and natural gas located in tight sedimentary rock formations, which would not be retrievable otherwise.[58] Since 1947, "[m]ore than 1.7 million U.S. wells have been completed using the fracking process, producing more than seven billion barrels of oil and 600 trillion cubic feet of natural gas."[59] As of 2015, over ninety percent of U.S. wells being drilled used fracking.[60]

Fracking faces scrutiny by the public and environmentalists because its process is subject to limited regulation on the federal and state level (depending on the state's regulations), and the potential risk of environmental issues, such as contamination of groundwater and air pollution.[61] Despite these concerns, oil and gas lobbyists continue to deter Congress from amending federal environmental laws to regulate the oil and gas

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56 *Id.*

57 *What is Hydraulic Fracturing? – Fracking Process Steps*, INTEGRATED FLOW SOL. (Sept. 3, 2019), https://ifsolutions.com/what-is-hydraulic-fracturing-fracking-process-steps [hereinafter *What is Hydraulic Fracturing?*].

58 Melissa Denchak, *Fracking 101*, NAT. RES. DEF. COUNCIL (Apr. 19, 2019), https://www.nrdc.org/stories/fracking-101#history.

59 *Hydraulic Fracturing*, INDEP. PETROLEUM ASS'N OF AM., https://www.ipaa.org/fracking/ (last visited Apr. 24, 2024).

60 Niel Kornze, Director, Bureau of Land Mgmt., Statement to House Natural Resources Committee Subcommittee on Federal Lands on Bureau of Land Management's Final Hydraulic Fracturing Rule (July 15, 2015).

61 *Fracking in the United States: 10 Key Questions*, CTR. FOR BIOLOGICAL DIVERSITY, https://www.biologicaldiversity.org/campaigns/fracking/10_questions.html (last visited Apr. 24, 2024).

industry.[62]

B. Overview of the Fracking Process

The fracking process begins by drilling a hole to create a well where a reservoir of oil and/or natural gas is within a tight sedimentary rock formation.[63] Oil and gas operators drill 7,000 to 10,000 feet underground.[64] Once the drill reaches near the sedimentary rock formation, it drills horizontally "and extends as far as thousands of feet."[65] Second, "[s]teel pipes called casings are inserted into the well, and the space between the rock and the casing is fully or partially filled with cement."[66] This casing helps prevent oil and natural gas leaks to the groundwater below the surface.[67] "A perforated pipe gun is sent into the horizontal part of the well."[68] This is the area of the well that the fracking process targets. Third, the oil and gas operators create the fracking fluid by combining groundwater or surface water with sand and chemicals.[69] Fracking operations use a significant amount of water.[70] Depending on the well's operations and the rock formation, "[w]ater use per well can be anywhere from about 1.5 million gallons to about 16 million gallons."[71] Fourth, the fracking fluid is injected into the well at high pressure to create fractures in the

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62 Erin Kelly, *CERCLA and the Exemption of the Oil and Gas Industry*, Kleinman Ctr. for Energy Pol'y (July 6, 2021), https://kleinmanenergy.upenn.edu/news-insights/cercla-and-the-exemption-of-the-oil-and-gas-industry/.

63 Denchak, *supra* note 58.

64 *What is Hydraulic Fracturing?*, *supra* note 57.

65 Denchak, *supra* note 58.

66 *Id.*

67 Renee Cho, *The Fracking* Facts, Colum. Climate Sch. State of the Planet (June 6, 2014), https://news.climate.columbia.edu/2014/06/06/the-fracking-facts/.

68 *Id.*

69 *Id.*

70 *See How Much Water Does the Typical Hydraulically Fractured Well Require,* U.S. Geological Surv., https://www.usgs.gov/faqs/how-much-water-does-typical-hydraulically-fractured-well-require (last visited Apr. 24, 2024).

71 *Id.*

sedimentary rock formation.[72] Fifth, the fracking fluid (known as produced water after it is injected into the well) and gas and/or oil comes to the surface after the pressure is released.[73] Anywhere from three to eighty percent of the fracking fluid returns to the surface.[74] Sixth, and finally, the produced water "is stored on-site in tanks or pits before it is treated and released into surface waters, injected into deep wells for disposal, or recycled with or without treatment to be reused in more fracking."[75]

C. WHY IS PFAS POTENTIALLY USED IN FRACKING?

During the fracking process, fracking fluid is injected deep into the earth.[76] Fracking fluid is mostly composed of water and sand, but up to two percent of the fluid includes chemical additives.[77] "The chemicals serve a variety of purposes including killing bacteria inside the well[], reducing friction during high-pressure fracking, and as gelling agents to thicken the fluid so that the sand, suspended in the gelled fluid, can travel farther into underground formations."[78] In the oil and gas industry, there is no standard for the composition of fracking fluid.[79]

In 2008, a scientific paper described PFAS as an "emerging technology" in an oil industry journal.[80] Due to the chemicals' resistance to water and oil, the oil and gas industry

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72 Cho, *supra* note 67.
73 *Id.*
74 *Id.*
75 *Id.*
76 *See id.*
77 *What is Fracturing Fluid Made Of?,* FRACFOCUS, https://fracfocus.org/learn/what-is-fracturing-fluid-made-of (last visited Apr. 24, 2024).
78 DUSTY HORWITT & BARBARA GOTTLIEB, FRACKING WITH "FOREVER CHEMICALS" IN TEXAS 9 (2023).
79 *What is Fracturing Fluid Made Of?, supra* note 77.
80 Hiroko Tabuchi, *E.P.A. Approved Toxic Chemicals for Fracking a Decade Ago, New Files Show*, N.Y. TIMES (July 12, 2021), https://www.nytimes.com/2021/07/12/climate/epa-pfas-fracking-forever-chemicals.html#:~:text=E.P.A.-,Approved%20Toxic%20Chemicals%20for%20Fracking%20a%20Decade%20Ago%2C%20New%20Files,agency's%20own%20concerns%20about%20toxicity.

found that PFAS "can coax oil out of the ground most efficiently" when used in fracking fluid.[81] Further, PFAS can help "reduce friction for drill bits as they move through the ground" when used in the drilling portion of the process.[82]

In 2021, the Physicians for Social Responsibility (PSR) released a report claiming that the oil and gas industry likely use PFAS and chemicals that degrade into PFAS as chemical additives in fracking fluid.[83] Ten years prior, in 2010, EPA approved the use of new chemicals in the oil and gas industry, despite concerns "that the chemicals could break down into products similar to PFOA, the most infamous PFAS, whose use has been largely discontinued in the U.S as part of an agreement between chemical makers and EPA."[84] The precise chemicals used in fracking operations are unknown because "EPA records included only a generic name for the chemical: fluorinated acrylic alkylamino copolymer."[85]

The oil and gas industry is largely protected from disclosing specific chemicals used in fracking operations as long as their fracking fluid is deemed a trade secret.[86] The chemicals considered trade secrets are confidential.[87] Some states attempted to require disclosure by oil and gas companies to report to FracFocus, a nongovernmental organization that maintains a database with the chemicals used in fracking.[88] However, companies continue to assert the trade secret protections and are exempted from reporting.[89] Because of the secrecy, PSR cannot conclusively locate the generic name of

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81 *Id.*
82 Ahmed, *supra* note 8
83 Kelly Rondinelli et al., *Speculative Report Opens PFAS Front Against Fracking*, JD SUPRA (July 29, 2021), https://www.jdsupra.com/legalnews/speculative-report-opens-pfas-front-6243099/.
84 HORWITT & GOTTLIEB, *supra* note 78, at 3.
85 *Id.* at 4.
86 *Id.* at 14.
87 *Id.* at 6.
88 *Id.* at 8.
89 *Id.* at 21.

the chemical used in EPA records (fluorinated acrylic alkylamino copolymer) in FracFocus.[90] This means that, despite evidence supporting that PFAS are used in fracking operations, there are no oil and gas disclosures definitively stating that PFAS are used in fracking operations.

D. HOW FRACKING CAUSES PFAS CONTAMINATION

If PFAS chemicals, or chemicals that could break down into PFAS, are used in fracking operations, it could be one of the ways PFAS enter drinking water systems.[91] PFAS in fracking operations could contaminate the environment, and more specifically, groundwater, through: "(1) surface spills; (2) aquifer contamination during fracking; (3) aquifer contamination during disposal of fracking fluids in Class II wells; and (4) the reuse or recycling of produced water."[92]

Opponents of stricter regulation for fracking operations have asserted there is no evidence that fracking operations contaminate groundwater.[93] However, approximately eighty percent of fracking fluid returns to the surface after the pressure is released,[94] and these studies focus on the possibility of the fracking fluid migrating from the sedimentary rock formations upwards to the water aquifers.[95] There are multiple ways fracking fluid could contaminate groundwater without migrating upward to the water aquifers. Fracking fluid could contaminate groundwater through cracks in the casing and cement, through

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90 *Id.* at 8.

91 Nicole Greenfield, *In Colorado, Oil and PFAS Shouldn't Mix*, NAT. RES. DEF. COUNCIL (Jan. 12, 2023), https://www.nrdc.org/stories/colorado-oil-and-pfas-shouldnt-mix.

92 Rondinelli et al., *supra* note 83.

93 *See Scientists Agree: Fracking Doesn't Harm Our Water*, COLORADANS FOR RESPONSIBLE ENERGY DEV., https://www.cred.org/scientists-fracking-doesnt-harm-water/ (last visited Apr. 24, 2024) [hereinafter *Scientists Agree*].

94 Cho, *supra* note 67.

95 *See Scientists Agree*, *supra* note 93.

leaks in underground wells or surface pits, and discharging wastewater into the environment.[96] Given this potential source for PFAS contamination, it is important to understand how fracking is regulated under federal and state law.

IV. HOW IS FRACKING REGULATED?

A. FEDERAL LAW

1. RESOURCE CONSERVATION AND RECOVERY ACT (RCRA)

RCRA authorizes EPA to create standards and regulation for hazardous and non-hazardous solid waste.[97] Under RCRA, the oil and gas industry are subject to limited regulation. RCRA specifies that "[d]rilling fluids, produced waters, and other wastes associated with the exploration, development, or production of crude oil, natural gas . . . " are *not* hazardous waste.[98] Because fracking fluid and produced water do not constitute hazardous waste, they are exempted from most of the strict regulatory regime of RCRA "and, by extension, from the Comprehensive Environmental Response, Compensation and Liability Act [CERCLA] . . . , which adopts the same definition of hazardous waste."[99] Therefore, regulation of waste from oil and gas production is largely left to each state with guidance from EPA.

Additionally, CERCLA authorizes EPA to remediate hazardous waste sites and enforce liability against responsible parties.[100] "CERCLA authority is confined to

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96 David Bond, *Are We Being Kept Safe From 'Forever Chemicals' Injected into Fracking Sites?*, THE GUARDIAN (July 21, 2021), https://www.theguardian.com/commentisfree/2021/jul/21/toxic-forever-chemicals-pfas-fracking.

97 *Resource Conservation and Recovery Act (RCRA) Laws and Regulation*, ENV'T PROT. AGENCY, https://www.epa.gov/rcra (last updated Feb. 13, 2024).

98 40 C.F.R. § 261.4(b)(5).

99 NRDC POLICY BASIS, *supra* note 55.

100 *Summary of the Comprehensive Environmental Response, Compensation, and Liability Act*

'hazardous substances,' which expressly precludes petroleum (including crude oil or any fraction thereof that is not listed), and natural gas and natural gas liquids."[101] This is problematic as CERCLA adopts the same definition of hazardous waste as the RCRA.[102] Nonetheless, fracking operations could be subject to liability under CERCLA if any hazardous substances comingle with petroleum in fracking fluid.[103] However, oil and gas operators can avoid this liability by simply not using substances designated as hazardous under CERLA in their fracking fluid.[104] Therefore, oil and gas wastes are likely precluded from liability to remediate former fracking sites under CERCLA.

2. CLEAN WATER ACT (CWA)

The CWA authorizes EPA to regulate surface water and the discharge of pollutants into surface waters.[105] However, the oil and gas industry is exempt from permitting for stormwater runoff.[106] Under the CWA, EPA is not permitted to require stormwater runoff permits for oil and gas operations.[107] This means that fracking sites, which may leave produced water in surface pits, are neither required to permit for stormwater runoff nor

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(SuperFund), ENV'T PROT. AGENCY, https://www.epa.gov/laws-regulations/summary-comprehensive-environmental-response-compensation-and-liability-act#:~:text=The%20Comprehensive%20Environmental%20Response%2C%20Compensation%2C%20and%20Liability%20Act%20%2D%2D%20otherwise,and%20contaminants%20into%20the%20environment (last updated Sept. 6, 2023).

101 Kelley Drye & Warren LLP, *EPA Enforcement and Fracking – Why Superfund and Why Now?*, LEXOLOGY (Feb. 21, 2012), https://www.lexology.com/library/detail.aspx?g=ebfb3a00-af44-479c-86d4-113ae5908a08.

102 NRDC POLICY BASIS, *supra* note 55.

103 Sean H. Joyner, *Superfund to the Rescue – Seeking Potential CERCLA Response Authority and Cost Recovery Liability for Releases of Hazardous Substances Resulting from Hydraulic* Fracturing, 28 J. CONTEMP. HEALTH L. & POL'Y 111, 133–34 (2011).

104 *Id.* at 130.

105 *Summary of the Clean Water Act*, ENV'T PROT. AGENCY, https://www.epa.gov/laws-regulations/summary-clean-water-act (last updated June 22, 2023).

106 NRDC POLICY BASIS, *supra* note 55.

107 *Oil and Gas Stormwater Permitting*, ENV'T PROT. AGENCY, https://www.epa.gov/npdes/oil-and-gas-stormwater-permitting#:~:text=Clean%20Water%20Act%20(CWA)%20section,of%20flows%20that%20are%20from (last updated Aug. 7, 2023).

create a Stormwater Pollution Prevention Plan to ensure produced water does not contaminate stormwater.[108]

Additionally, under CWA effluent guidelines, wastewater discharged into surface waters must have zero pollutants, but wastewater produced by unconventional oil and gas extraction "can be discharged, untreated, . . . to the receiving stream."[109] Fracking operations are an unconventional oil and gas extraction method because it is not traditional drilling.[110] If wastewater from fracking operations is discharged into surface waters, it is regulated by the CWA.[111] However, if wastewater is not discharged into surface waters, then the CWA does not apply.[112] Wastewater from fracking operations is either disposed of in Class II disposal wells or into "temporary surface pits."[113] Therefore, fracking operations are subject to limited enforcement under the CWA unless they discharge wastewater into surface waters.[114]

3. SAFE DRINKING WATER ACT (SDWA)

Under the SDWA, EPA sets standards and regulations for the levels of contaminants in public drinking water.[115] The SDWA also authorizes EPA to regulate State

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108 Amy Mall, *Big Storms and Fracking: What's at Stake?*, NAT. RES. DEF. COUNCIL (Oct. 30, 2012).

109 *Unconventional Oil and Gas Extraction Effluent Guidelines*, ENV'T PROT. AGENCY, https://www.epa.gov/eg/unconventional-oil-and-gas-extraction-effluent-guidelines (last updated Oct. 31, 2023).

110 Jason Fernando, *Unconventional Oil: What it is, How it Works, Examples*, INVESTOPEDIA (June 30, 2022), https://www.investopedia.com/terms/u/uncoventional-oil.asp#:~:text=In%20the%20oil%20and%20gas,fracking")%2C%20among%20others.

111 VIVIAN UNDERHILL ET AL., 50 YEARS AFTER THE CLEAN WATER ACT, TOXIC CHEMICALS IT REGULATES ARE STILL USED IN FRACKING 4 (2022).

112 *Id.*

113 *Id.*

114 *Id.*

115 *Drinking Water Standards and Regulations*, CTR. FOR DISEASE CONTROL AND PREVENTION, https://www.cdc.gov/healthywater/drinking/public/regulations.html#:~:text=The%20Safe%20Drinking%20Water%20Act%20(SDWA)%20was%20passed%20by%20Congress,suppliers%20who%20enforce%20those%20standards (last visited Apr. 24, 2024).

underground injection control programs.[116] This program includes Class II injection wells for oil and gas operations.[117] There are three types of Class II injection wells: (1) disposal wells, (2) enhanced recovery wells, and (3) hydrocarbon storage wells.[118] For disposal wells, brines that are brought up to the surface during oil and gas extraction "are separated from hydrocarbons at the surface and reinjected into the same or similar underground formations for disposal."[119] This includes produced water from fracking, which may include PFAS.[120] The second type of Class II injection wells includes enhanced recovery wells, which cover enhanced recovery processes and the fracking process.[121] However, EPA is limited on regulating enhanced recovery wells specifically in terms of fracking because EPA only has authority "when diesel fuels are used in fluids or propping agents."[122] Essentially, if fracking fluid does not contain diesel fuels, then it is not regulated under enhanced recovery wells.

In 2004, EPA studied public drinking water and fracking, and it concluded that fracking "poses little or no threat to [underground sources of drinking water]."[123] In fact, after this study, Congress amended the SDWA to exclude EPA from regulating, "(i) the underground injection of natural gas for purposes of storage; and (ii) the underground injection of fluids or propping agents (other than diesel fuels) pursuant to hydraulic

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116 *See* 42 U.S.C. § 300h(a).

117 *Underground Injection Control (UIC), Class II Oil and Gas Related Injection Wells*, ENV'T PROT. AGENCY, https://www.epa.gov/uic/class-ii-oil-and-gas-related-injection-wells (last updated Aug. 1, 2023).

118 *Id.*

119 *Id.*

120 *Id.*

121 *Id.*

122 *Id.*

123 William J. Brady, *Hydraulic Fracturing Regulation in the United States: The Laissez-Faire Approach of the Federal Government and Varying State Regulations*, 14 VT. J. ENV'T L. 39, 40 (2012).

fracturing operations related to oil, gas, or geothermal production activities."[124] Of the 180,000 Class II wells operating in the U.S., potentially eighty percent may not be regulated if they were solely used for fracking operations and did not use diesel fuels.[125]

This is severely problematic. One of the ways that fracking can contaminate groundwater with PFAS is through contamination of aquifers from disposal of fracking fluids via Class II wells.[126] The primary federal environmental law that protects drinking water explicitly exempts fracking operations from EPA regulation. In 2016, EPA concluded that fracking "activities can impact drinking water resources under some circumstances."[127] However, EPA was unable to comprehensibly assess the impacts of fracking on drinking water because EPA lacked critical information, such as what chemicals are used as the chemical additives in fracking fluid.[128]

The exemption for fracking operations under the SDWA is known as the "'Halliburton loophole' because it is widely perceived to have come about as a result of the efforts of Vice President Dick Cheney's Energy Task Force."[129] Vice President Cheney was a former CEO of Halliburton, one of the major manufacturers of fracking fluid.[130] Under the exemption, fracking fluid is not regulated under the SDWA even though the fracking process includes drilling into groundwater sources.[131]

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124 42 U.S.C. § 300h(d)(1)(B).

125 *See Underground Injection Control (UIC), Class II Oil and Gas Related Injection Wells*, *supra* note 117.

126 Rondinelli et al., *supra* note 83.

127 ENV'T. PROT. AGENCY, HYDRAULIC FRACTURING FOR OIL AND GAS: IMPACTS FROM THE HYDRAULIC FRACTURING WATER CYCLE ON DRINKING WATER RESOURCES IN THE UNITED STATES 1 (2016).

128 *Id.* at 41.

129 *The Halliburton Loophole*, EARTHWORKS, https://earthworks.org/issues/inadequate_regulation_of_hydraulic_fracturing/ (last visited Apr. 24, 2024).

130 *Id.*

131 *Id.*

B. STATE LAW

1. TEXAS

In Texas, the Texas Railroad Commission (RRC) regulates the oil and gas industry, including fracking operations.[132] The RRC regulates fracking by implementing construction requirements for the casings inserted into wells during the second step of the fracking process.[133] Under Texas law, the Texas Commission on Environmental Quality (TCEQ) regulates any surface water retrieved for fracking fluid, while any groundwater retrieved is subject to the rule of capture.[134] The SDWA authorizes the RRC to regulate the disposal of produced water in disposal wells, which is how most produced water is disposed of in Texas.[135]

The RRC rules require oil and gas operators to disclose the chemicals used in fracking fluid to FracFocus.[136] However, suppliers and operators are exempt from disclosing chemicals that *they* deem as trade secret.[137] This is problematic in two ways. First, the rules allow oil and gas operators to themselves determine whether a chemical is considered a trade secret.[138] Second, a challenge to a specific well's chemical trade secret exemption is limited to (1) landowners at or adjacent to the well head or (2) an agency with

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[132] *Hydraulic Fracturing*, TEX. R.R COMM'N, https://www.rrc.texas.gov/about-us/faqs/oil-gas-faq/hydraulic-fracturing-faqs/ (last visited Apr. 24, 2024).

[133] *Id.*

[134] *Id.*; Tiffany Dowell, *Did You Know? Q&A With Tiffany Dowell*, TEX. WATER RES. INST., https://twri.tamu.edu/publications/txh2o/2014/summer-2014/did-you-know/#:~:text=The%20rule%20of%20capture%20is,the%20expense%20of%20his%20neighbor (last visited Apr. 24, 2024) ("The rule of capture essentially provides that because a landowner owns the water beneath his property, the landowner has the right to pump as much water as he wishes even at the expense of his neighbor.").

[135] *Hydraulic Fracturing*, *supra* note 132.

[136] 16 Tex. Admin. Code. § 3.29(a)(8), § (c).

[137] *Id.* § 3.29(c)(1)(B), § (c)(2)(C), § (d)(4).

[138] *Id.*

jurisdiction.[139] FracFocus is meant to provide disclosure to the general public regarding chemicals used at each well, yet an undisclosed amount of chemicals are not reported. Further, if a landowner, relevant department, or agency does not challenge the trade secret exemption, then a chemical will never be subject to a mandated disclosure.

2. COLORADO

In Colorado, the Colorado Energy & Carbon Management Commission (ECMC) regulates the oil and gas industry, including fracking operations.[140] In stark comparison to Texas, "Colorado has some of the strongest fracking regulations in the nation."[141] The ECMC also regulates fracking by implementing construction requirements for the casings inserted into wells during the second step of the fracking process.[142] Working in conjunction with the ECMC, the Colorado Division of Water Resources (DWR) regulates any water retrieved for fracking fluid—this includes surface water and groundwater in Colorado.[143]

ECMC Rule 609 requires oil and gas operators to sample nearby groundwater before *and* after drilling.[144] This is not required in Texas. However, similar to Texas, the largest oil companies in Colorado dispose of produced water in disposal wells more than

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[139] *Id.* § 3.29(f).

[140] *About the ECMC*, COLO. ENERGY & CARBON MGMT. COMM'N, https://ecmc.state.co.us/about.html#/about (last visited Apr. 24, 2024).

[141] *Debunking the Myth: Fracking is Regulated*, COLORADANS FOR RESPONSIBLE ENERGY DEV., https://www.cred.org/debunking-the-myth-fracking-is-regulated/ (last visited Apr. 24, 2024).

[142] STATE OF COLO. OIL & GAS COMM'N, COLO. DEP'T OF NAT. RES., INFORMATION ON HYDRAULIC FRACTURING 1.

[143] *Water Administration*, COLO. DIV. OF WATER RES., https://dwr.colorado.gov/services/water-administration (last visited Apr. 24, 2024).

[144] COLO. OIL & GAS ASS'N, GROUNDWATER FACT SHEET 1 (2019), https://www.coga.org/uploads/1/2/2/4/122414962/fact_sheet_-_groundwater_final_6-13-19.pdf.

they recycle.[145] This may change in the near future—during the 2023 Regular Session, HB23-1242 was enacted to require the ECMC to adopt rules "requiring a statewide reduction in usage of fresh water and a corresponding increase in usage of recycled or reused water in oil and gas operations."[146] This law was passed partially because oil and gas operations in Colorado more than doubled their freshwater usage in the past decade.[147]

Additionally, Colorado Code of Regulations Rule 208 requires Disclosers ("[o]perator[s], vendor[s], or service provider[s]") to disclose upon request the chemicals used in fracking fluid.[148] Similar to Texas, Colorado has a trade secret exemption that allows Disclosers to designate certain chemicals as trade secret.[149] However, unlike Texas, to designate the chemical as trade secret, the ECMC requires its Director to approve the designation.[150] The chemical becomes confidential only *after* the ECMC Director approves it as trade secret.[151]

V. EFFORTS BY THE EPA TO CURB PFAS EXPOSURE

A. WATER QUALITY STANDARDS

At present, EPA has issued drinking water health advisories for four PFAS chemicals: PFOA, PFOS, GenX Chemicals, and perfluorobutane sulfonic acid (PFBS).[152] However, the issue with drinking water health advisories is that they are not legally

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145 *See* Angelika Albaladejo, *Colorado Plans to Reduce Oil and Gas Industry's Waste Water*, DENVER 7 (Aug. 4, 2023), https://www.denver7.com/news/local-news/colorado-plans-to-reduce-oil-and-gas-industrys-water-waste.

146 H.B. 1242, 73rd Gen. Assemb. Reg. Sess. (Colo. 2023).

147 Albaladejo, *supra* note 145.

148 2 COLO. CODE REGS. § 404-1-208(a) (2014).

149 *Id.* § 404-1-208(b).

150 *Id.*

151 *Id.*

152 *See Drinking Water Health Advisories (HAs)*, ENV'T PROT. AGENCY, https://www.epa.gov/sdwa/drinking-water-health-advisories-has (last updated May 30, 2023).

enforceable.[153] In March 2023, EPA proposed a rule that would set drinking water standards for six PFAS chemicals: PFOA, PFOS, GenX Chemicals, PFBS, perfluorononanoic acid (PFNA), and perfluorohexane sulfonic acid (PFHxS).[154] The rule would require public water systems to report to the public the levels of these chemicals in their water system and to "reduce the levels of these PFAS in drinking water if they exceed the proposed standards."[155] This rule has not yet been finalized by EPA.[156]

B. RCRA

In October 2021, EPA announced its plan to initiate rulemaking under RCRA that would add four PFAS chemicals (PFOA, PFOS, PFBS, and GenX chemicals) as "RCRA Hazardous Constituents under Appendix VIII."[157] If these chemicals are added to Appendix VIII, they could be listed as RCRA hazardous wastes if EPA determines the chemical poses "a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported or disposed of, or otherwise managed."[158] EPA's determination considers the following factors:

(i) The nature of the toxicity presented by the constituent.
(ii) The concentration of the constituent in the waste.
(iii) The potential of the constituent or any toxic degradation product of the constituent to migrate from the waste into the environment under the types of improper management considered in paragraph (a)(3)(vii) of this section[.][159]

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153 *Id.*

154 *Per- and Polyfluoroalkyl Substances (PFAS): Proposed PFAS National Primary Drinking Water Regulation*, ENV'T PROT. AGENCY, https://www.epa.gov/sdwa/and-polyfluoroalkyl-substances-pfas (last updated Apr. 23, 2024).

155 *Id.*

156 *Id.*; *Stakeholder Comment on Draft PFAS Legislation*, U.S. S. COMM. ON ENV'T & PUB. WORKS (June 22, 2023), https://www.epw.senate.gov/public/index.cfm/2023/6/stakeholder-comment-on-draft-pfas-legislation (covering the release of draft legislation for PFAS, which requires EPA to finalize rulemaking for PFAS water quality standards by Sept. 30, 2024) [hereinafter *Draft PFAS Legislation*].

157 Press Release, Env't Prot. Agency, EPA Responds to New Mexico Governor and Acts to Address PFAS Under Hazardous Waste Law (Oct. 26, 2021), https://www.epa.gov/newsreleases/epa-responds-new-mexico-governor-and-acts-address-pfas-under-hazardous-waste-law.

158 40 C.F.R. § 261.11(a)(3).

159 *Id.* § 261.11(a)(3)(i–iii).

If these chemicals are listed as a hazardous waste under the RCRA, then entities that produce waste with any of these four PFAS chemicals would be subject to regulatory enforcement from the time the waste is created to its ultimate disposal under RCRA.[160] This rule has not yet been proposed by EPA.

C. CERCLA

In September 2022, EPA published a proposed rule that would list PFOA and PFOS as a hazardous substance under CERCLA.[161] Although this would only include two of the 12,000 known PFAS, it would hold parties accountable for future releases of these two chemicals.[162] EPA finalized this rule on April 17, 2024.[163]

D. TOXICS RELEASE INVENTORY

In October 2023, EPA finalized a rule that will require industries covered by the Toxics Release Inventory (TRI) to report to EPA their use or release of PFAS even if the amount used or released is a miniscule amount.[164] This will expand EPA's knowledge on which industries are using PFAS and where they are being released.[165] The reporting will require industries to provide the quantities of PFAS used and where they disposed of these chemicals.[166]

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160 *See Learn the Basics of Hazardous Waste*, ENV'T PROT. AGENCY, https://www.epa.gov/hw/learn-basics-hazardous-waste (last updated Apr. 11, 2024).

161 *Proposed Designation of Perfluorooctanoic Acid (PFOA) and Perfluorooctanesulfonic Acid (PFOS) as CERCLA Hazardous Waste Substances*, ENV'T PROT. AGENCY, https://www.epa.gov/superfund/proposed-designation-perfluorooctanoic-acid-pfoa-and-perfluorooctanesulfonic-acid-pfos (last updated Oct. 30, 2023).

162 *Id.*

163 *Designation of PFOA and PFOS as hazardous substances under CERCLA Release Reporting Requirements Factsheet*, ENV'T PROT. AGENCY, https://www.epa.gov/epcra/designation-pfoa-and-pfos-hazardous-substances-under-cercla-release-reporting-requirements (last updated Aug. 28, 2024).

164 Press Release, Env't Prot. Agency, EPA Finalizes Rule to Require Enhanced PFAS Reporting to the Toxics Release Inventory (Oct. 20, 2023), https://www.epa.gov/newsreleases/epa-finalizes-rule-require-enhanced-pfas-reporting-toxics-release-inventory.

165 *Id.*

166 *Id.*

VI. PFAS REMEDIATION

Removing PFAS from the environment, drinking water, and wastewater is a difficult and expensive process. The current process for remediating PFAS focuses on filtering PFAS from drinking water and finding ways to destroy the PFAS waste once it has been filtered out.[167] EPA recognizes three remedial processes that may be effective for filtering PFAS out of drinking water: (1) granular activated carbon, (2) ion exchange resins, and (3) high pressure membrane systems.[168]

A. GRANULAR ACTIVATED CARBON

Activated carbon treatment is one effective treatment for removing PFAS from drinking water. Activated carbon treatment is the process of using granular activated carbon (GAC) to absorb PFAS in water.[169] GAC is made up of granular organic materials with high carbon contents, such as wood or coal, that adsorb contaminants.[170] GAC acts as a filter, while the water flows through it and separates out the PFAS contaminants.[171] However, GAC is more effective with longer chain carbons (PFOA and PFOS), than shorter chain carbons (GenX Chemicals).[172] For example, GAC's maximum removal

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167 Aria Bendix, *'Forever Chemicals' Stay in the Air and Water Permanently. But Scientists Have Found a New Way to Destroy Them*, NBC NEWS (Aug. 18, 2022), https://www.nbcnews.com/health/health-news/new-way-destroy-pfas-forever-chemicals-rcna43528; *Draft PFAS Legislation*, *supra* note 156 (discussing how the draft legislation creates "a prize competition to encourage innovation in the development of technologies that can help identify PFAS in the environment, prevent further contamination, and remediate or destroy PFAS.").

168 *PFAS Treatment in Drinking Water and Wastewater – State of the Science*, ENV'T PROT. AGENCY, https://www.epa.gov/research-states/pfas-treatment-drinking-water-and-wastewater-state-science#:~:text=It%20is%20currently%20known%20that,and%20high%2Dpressure%20membrane%20systems (last updated Nov. 7, 2023).

169 *Reducing PFAS in Drinking Water with Treatment Technologies*, ENV'T PROT. AGENCY (Aug. 23, 2018), https://www.epa.gov/sciencematters/reducing-pfas-drinking-water-treatment-technologies [hereinafter *Reducing PFAS in Drinking Water*].

170 *Id.*

171 *Id.*

172 *Id.*

performance for PFOS is ninety-nine percent, while PFBS is ninety-eight percent.[173] This means that GAC is not entirely effective at filtering all PFAS from drinking water. Filtering PFAS using GAC is likely to be cost-efficient, however there may be additional costs for reactivating the GAC, where the PFAS on the filter is destroyed and the filter is reused.[174]

B. ION EXCHANGE RESINS

Ion exchange resins are another effective treatment for removing PFAS from drinking water. Ion exchange resins are "highly porous, polymeric material" that remove negative charged ions like PFAS.[175] Positively charged anion exchange resins trap and hold negatively charged ions, removing them from drinking water.[176] This method is more effective at removing shorter chain carbons than longer chain carbons.[177] For example, the ion exchange resins' maximum removal performance for PFOA is ninety-seven percent, while PFBS is ninety-eight percent.[178] This means that ion exchange resins could be used after or in conjunction with GAC to capture shorter chain carbon PFAS that the GAC might miss.[179] However, ion exchange resins are usually more costly than GAC.[180]

C. HIGH PRESSURE MEMBRANE SYSTEMS

High pressure membrane systems are another effective treatment for removing PFAS from drinking water. High pressure membrane systems involve pressurized water for treatment that goes through a membrane that only allows selective permeation and

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173 AM. WATER WORKS ASS'N, DRINKING WATER TREATMENT FOR PFAS SELECTION GUIDE: TECHNICAL SUPPORT ON PER- AND POLYFLUOROALKYL SUBSTANCES POLICY 10 [hereinafter DRINKING WATER TREATMENT].

174 *Id.* at 12.

175 *Reducing PFAS in Drinking Water*, *supra* note 169.

176 *Id.*

177 Fuhar Dixit et al., *PFAS Removal by Ion Exchange Resins: A Review*, CHEMOSPHERE, Feb. 3, 2021, at 1, 3.

178 DRINKING WATER TREATMENT, *supra* note 173, at 15.

179 Dixit et al., *supra* note 177, at 10–11.

180 *Reducing PFAS in Drinking Water*, *supra* note 169.

removes PFAS from water.[181] Nanoporous membranes like nanofiltration and reverse osmosis (RO) are used for the membrane.[182]

Compared to GAC and ion exchange resins, the membrane does not need to be replaced frequently and remains consistent in removing PFAS throughout the course of the membrane's years of use.[183] High pressure membrane systems are able to remove both long-chain and short-chain carbons efficiently.[184] For example, the removal performance for PFOA is 99%, while for PFBS is 99.8%.[185] However, because high pressure membrane systems filter out PFAS without destroying them, the process leaves PFAS waste, so the main issue with this removal method is how to dispose of this byproduct.[186]

D. PFAS WASTE DISPOSAL

Once PFAS is filtered from drinking water, the remaining issue is how to properly dispose of PFAS waste. At present, PFAS waste is disposed of by "incineration, landfilling, discharge into wastewater treatment systems, and deep well injection."[187] However, each method has its own drawbacks. Incineration and wastewater treatments may not destroy all PFAS waste, and landfilling and deep well injection are subject to leakage and further contamination.[188]

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181 Tae Lee et al., *High-Pressure Membrane Filtration Process for Separation of Per- and Polyfluoroalkyl Substances (PFAS)*, CHEMICAL ENG'G J., Mar. 2022, at 1, 3; *see also* Julie Nemeth-Harn, *What is Membrane Water Treatment Technology and Why Do We Specialize In It?*, HARN R/O SYSTEMS: BLOG (Aug. 3, 2020), https://blog.harnrosystems.com/what-is-membrane-water-treatment-technology-and-why-do-we-specialize-in-it.

182 *See* Lee et al., *supra* note 181.

183 DRINKING WATER TREATMENT, *supra* note 169, at 19.

184 *Id.* at 20.

185 *Id.* at 21.

186 *Id.* at 22.

187 Tom Perkins, *US Industry Disposed of at Least 60m Pounds of PFAS Waste in Last Five Years*, THE GUARDIAN (Nov. 17, 2023), https://www.theguardian.com/environment/2023/nov/17/epa-pfas-forever-chemicals-waste-pollution-unregulated.

188 *Id.*

VII. WHAT STATES ARE DOING

A. TEXAS

Texas—the largest oil and gas state—has taken minimal action. There are no new laws from the Texas Legislature and governor, no new rules from the RRC, and no water quality standards from the Texas Commission on Environmental Quality (TCEQ).[189] TCEQ, which regulates wastewater discharge and surface water, is waiting to develop drinking water standards until EPA finalizes water quality standards for PFAS.[190] In addition to TCEQ's lack of drinking water standards, the agency is "not requiring monitoring for PFAS" for the Texas Pollutant Discharge Elimination System (TPDES), which is the regulatory program for discharging pollutants into surface waters.[191] This is problematic because in 2021, EPA granted the TCEQ authority to permit discharge of produced water in the state.[192] This means that produced water, which may contain PFAS, may receive a permit from the TCEQ to discharge in Texas waterways without requiring monitoring for PFAS.[193] In fact, scientists found that produced water from the Permian Basin contained PFAS.[194]

To better understand the use of PFAS in the Texas oil and gas industry, it is

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189 *See generally* Martha Pskowski, *Texas' Environmental Agency Enables Companies to Increase Oilfield Wastewater Disposal in Rivers*, THE TEX. TRIB. (Aug. 17, 2023), https://www.texastribune.org/2023/08/17/texas-oilfield-wastewater-rivers-tceq-fracking/ (discussing how researchers are still studying the health and environmental effects of dumping "produced water" into Texas bodies of water, but Texas regulators are moving forward anyway to allow more discharges of oil field wastewater into Texas waters).

190 Amy Settemeyer, TEX. COMM'N ON ENV'T QUALITY, TCEQ PFAS UPDATE FOR TWCA, https://www.twca.org/resources/Documents/Amy_S_TCEQ%20Update%20for%20TWCA.pdf.

191 *Id.*; *see also What is the "Texas Pollutant Discharge Elimination System (TPDES)"?*, TEX. COMM'N ON ENV'T QUALITY, https://www.tceq.texas.gov/permitting/wastewater/pretreatment/tpdes_definition.html (last visited Apr. 24, 2024).

192 Pskowski, *supra* note 189.

193 *Id.*

194 *Id.*

estimated that a single well in Texas injected 324 pounds of PFAS.[195] Approximately "one measuring cup of PFOA could contaminate almost 8 [billion] gallons of water."[196] So, a single well would inject approximately 622 cups of PFOA and be at risk of contaminating approximately 4.9 trillion gallons of water. That is enough water to fill 10,155,102 Olympic sized swimming pools. Currently, there are approximately 118,957 operating wells in Texas.[197]

B. COLORADO

During the Colorado 2022 Regular Session, Governor Polis signed into law HB22-1348, requiring Disclosers to report chemicals used in oil and gas operations to the ECMC, which, in turn, will disclose to the public.[198] In addition to reporting, Disclosers must provide to the ECMC "a declaration that the chemical product contains no intentionally added perfluoroalkyl or polyfluoroalkyl chemicals."[199] From this information, the ECMC will create a chemical disclosure list for each well and the well's operator will be required to provide this list to persons and entities located near the well.[200] This law also requires Disclosers who operated a well prior to its enactment to disclose chemicals and provide the ECMC with the declaration.[201]

This law is innovative because it addresses the main issue with PFAS and fracking operations—that is, we do not *know* conclusively that fracking operations use PFAS as a chemical additive. With Colorado's new law, the ECMC and the public will learn whether

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195 Bond, *supra* note 96.
196 *Id.*
197 U.S. ENERGY INFO. ADMIN., TEXAS STATE ENERGY PROFILE (2023), https://www.eia.gov/state/print.php?sid=TX.
198 H.B 1348, 72nd Gen. Assemb., Reg. Sess. (Colo. 2022).
199 *Id.* at 7.
200 *Id.* at 10.
201 *Id.* at 7.

PFAS chemicals are in fact being used in fracking operations.

Additionally, during the 2022 Regular Session, Governor Polis signed into law HB22-1345, which "prohibits the sale or distribution of fluids used in hydraulic fracturing, drilling fluids, and proppants—materials injected to keep geologic fractures open—that contain PFAS."[202] This law makes Colorado the first state to ban PFAS in oil and gas operations.[203]

Some entities are pushing back against the claim that PFAS may be in fracking operations in Colorado.[204] The American Petroleum Institute, a trade association that represents the oil and gas industry, asserts that PFAS is not used in fracking fluid in Colorado.[205] Additionally, opponents have criticized HB22-1348 claiming the law is not economically feasible because it requires duplicate information on the ECMC website, while FracFocus is already in place.[206]

VIII. PFAS PROPOSAL

PFAS remediation is a complicated issue because the category encompasses over 12,000 chemicals.[207] More is unknown rather than known about each of these chemicals. So far, EPA has begun initiating rulemaking for six of the 12,000 PFAS chemicals, but that

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202 Cindy Hogue, *Colorado Bans PFAS in Oil- and Gas- Extraction Products*, C&EN (June 6, 2022), https://cen.acs.org/environment/persistent-pollutants/Colorado-bans-PFAS-oil-gas-extraction/100/web/2022/06; H.B. 1345, 72nd Gen. Assemb., Reg. Sess. (Colo. 2022).

203 Press Release, Safer States, Colorado Governor Signs First-in-Nation Ban on PFAS "Forever Chemicals" in Oil and Gas Products (June 3, 2022), https://www.saferstates.org/press-room/colorado-governor-signs-first-in-nation-ban-on-pfas-forever-chemicals-in-oil-and-gas-products/#:~:text=PORTLAND%2C%20OR%20%E2%80%94Today%2C%20Colorado,products%3B%20textile%20furnishings%3B%20and%20upholstered.

204 *See* COLO. OIL & GAS ASS'N, PFAS MISINFORMATION FACT SHEET 1 (2022), https://www.coga.org/uploads/1/2/2/4/122414962/fact_sheet_-_pfas_final__2.23.22_.pdf.

205 Scott Weiser, *Polis Signs New Law Mandating Disclosure of Fracking* Chemicals, THE DENVER GAZETTE (June 9, 2022), https://denvergazette.com/news/government/polis-signs-new-law-mandating-disclosure-of-fracking-chemicals/article_583ab9a0-e83c-11ec-9a13-fb3a7ec80b32.html.

206 *Id.*

207 Knoblauch, *supra* note 5.

is not enough. Drinking water systems throughout the U.S. are contaminated with PFAS chemicals, and the ability to test for *all* known PFAS chemicals is unworkable. Additionally, there are many ways that PFAS can contaminate groundwater sources. One that cannot be explicitly ruled out due to the lack of transparency in the industry is fracking operations. Therefore, the following proposals for regulations will be limited to fracking operations.

To combat the loopholes and exemptions for the oil and gas industry, the following regulatory reforms are recommended: (1) ban the use of PFAS (or chemicals that could degrade into PFAS) in fracking operations, (2) report to EPA if any chemicals under the PFAS umbrella have been used in fracking operations, (3) require Disclosers to disclose fracking fluid chemicals to state regulators and FracFocus with no trade secret exemption, and (4) amend federal environmental laws to no longer exempt the oil and gas industry from federal regulation.

A. Ban the Use of PFAS or Chemicals that can Degrade into PFAS in Fracking Operations

Although it is inconclusive whether PFAS chemicals or chemicals that could degrade into PFAS are used in fracking operations, states should follow Colorado's lead and ban the use of PFAS or chemicals that could degrade into PFAS in fracking operations. This will ensure that fracking is not a source of PFAS contamination in drinking water, regardless of whether fracking actually contaminates groundwater. In effect, this will either have no change for fracking operators that are not using PFAS-like chemicals for fracking, or it will require innovation for fracking operators to use less toxic, alternative chemicals.

B. Disclose to EPA if Any Chemicals under the PFAS Have Been Used in Fracking Operations

The rule EPA finalized under the TRI, which requires industries to report their use

of PFAS chemicals even in small amounts, may not apply to fracking operations.[208] In 2011, EPA finalized a rule that included natural gas processing centers under the TRI.[209] However, fracking operations do not constitute as natural gas processing centers.[210] At the time, EPA asserted that it was already engaging in rulemaking regarding the extraction of oil and declined to include fracking operations under the TRI.[211] Therefore, it is unlikely that fracking operations would be subject to the new rule requiring reporting to EPA if they used a miniscule amount of PFAS. EPA should initiate rulemaking to designate fracking operations under the TRI and close this gap in reporting. This would require fracking operations to disclose to EPA if small amounts of PFAS chemicals were used in fracking operations.

C. Require Disclosers to Disclose Fracking Fluid Chemicals to State Regulators and FracFocus without Trade Secret Exemption

Because fracking regulations are largely left to the states, Disclosers should be required to disclose the chemicals used in fracking fluid to state regulators. Like Colorado, the chemicals should be disclosed to state regulators and the Director of the Commission must determine whether the chemical is a trade secret. Once disclosed, the information should be made available on FracFocus, including any chemicals that fall under the PFAS umbrella. Additionally, any citizen of the state should be allowed to challenge the

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208 Memorandum from Bergeson & Campbell, P.C., 2022 TRI Reporting Deadline is July 1, 2023–What is New This Year? (2023), https://www.lawbc.com/2022-tri-reporting-deadline-is-july-1-2023-what-is-new-this-year/

209 *Addition of Natural Gas Processing Facilities to the Toxics Release Inventory Final Rule*, Env't Prot. Agency, https://www.epa.gov/toxics-release-inventory-tri-program/addition-natural-gas-processing-facilities-toxics-release#:~:text=Rule%20Summary,-In%20November%202021&text=Natural%20gas%20processing%20facilities%20that%20primarily%20recover%20sulfur%20from%20natural,not%20included%20in%20this%20rule (last updated Sept. 26, 2023).

210 *See* Bergeson & Campbell, P.C., *supra* note 208.

211 Letter from Gina McCarthy, Adm'r, Env't Prot. Agency to Eric Schaeffer, Exec. Dir., Env't Integrity Project 6 (Oct. 22, 2015), https://www.regulations.gov/document/EPA-HQ-TRI-2013-0281-0047,.

Director's determination of a trade secret.

D. Amend Federal Laws to Subject Oil and Gas Industry to Regulation

There are several federal environmental laws that exempt the oil and gas industry from enforceability, such as the SDWA and RCRA. These federal environmental laws should be amended to no longer shield the oil and gas industry from enforcement and regulation.

IX. Conclusion

Synthetic chemicals have the capability of producing significant harms to the environment and human health. Specifically, PFAS chemicals have been found to harm humans and the environment. PFAS chemicals have been used in a wide range of industries: from consumer products to potentially fracking operations. These chemicals now contaminate the U.S. drinking water supply, and it is essential to combat these contaminations by identifying the sources and holding these sources accountable. In addition to EPA rulemaking, states should produce new legislation at a quicker pace. Requiring fracking operators to disclose the chemicals used in fracking operations, including those that are or could degrade into PFAS, is a step in the right direction. It is only a matter of time until the public will receive clarity from Colorado affirming or denying the use of PFAS in fracking operations. But for now, the public must wait and see.

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